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PHARMACEUTICAL NOTES OF TRAVEL.

By EDWARD PARRISH.

(Continued from page 17.)

Having at the close of the previous essay taken leave of the Manchester pharmaceutical establishments and chemical works, I proceed to remark upon the general character of the shops in some of the other towns. Those in Oxford and Leamington were noticed as particularly elegant, rich mahogany fittings and plate-glass windows and show-cases giving them a fine finish. At Chester, amid the ancient buildings of that unique old town, I noticed several very handsome pharmaceutical shops, one in particular, in which the appropriate arrangement of mirrors gave a great apparent increase of length to the room; the shops are generally in the second stories of the buildings fronting on balconies which extend along perhaps the whole length of a street. To the unaccustomed eye the contrast is most strange, of costly mirrors, beautiful carved oak shop-furniture and commodious arrangements for dispensing, with ancient dwellings and places of business, in which all the necessary repairs are not permitted to interfere with the prevailing unique and antiquated appearance.

In Liverpool some fine shops were also noticed. That of Clay & Abrams, Bold street, is one of the best conducted and largest; it has besides the ordinary arrangements for compounding and dispensing medicines, a set of vacuum pans for the evaporation of solutions at low temperatures.

Through the kindness of a member of this firm, I had an opportunity of spending an hour pleasantly and profitably in the Museum of the Liverpool Chemical Society, located in a

large apartment in the Royal Institute. A fine collection of specimens of those departments of natural history pertaining to the study of pharmacy, and of rare and elegant chemical products, in a series of flat and upright glass cases arranged parallel to each other across the apartment, formed one of the most attractive pharmaceutical museums I have ever visited. The mode of mounting and displaying specimens here and elsewhere in England, struck me as worthy the imitation of our colleges and natural history societies. Those which stand in upright cases near the line of vision are put into plain cylindrical bottles without shoulders and covered with a plate of glass, or into bottles made for the purpose, convex at the closed extremity and terminated at the open end by a ground stopper, so shaped as to form a stand for the bottle when it is inverted. For the specimens designed to be looked at from above, these inverted bottles are made of considerable diameter in proportion to their height, while some samples, such as nests of crystals, are placed on glass dishes and covered with a piece of plate glass or with a suitable bell glass.

Besides the specimens belonging to the Chemical Society, which, of course, it would occupy too much space to dwell upon in this essay, the Royal Institute contained a great variety, three series of which especially interested me : 1st. Sugars as derived from numerous sources and in their several states of preparation ; 2d, an extensive assortment of textile materials and fabrics, from all climes ; and 3d, a variety of products chiefly from palm oil prepared by Price's Candle Company, whose glycerine has obtained such an extensive sale in America. Some of these show a perfection in this branch of manufacture little suspected by those unacquainted with the recent progress of applied science in this direction.

"The General Apothecaries Company" have an extensive and elegant establishment in this city, and a less conspicuous one in Birmingham. This Company issue from time to time a publication called the Record of Pharmacy and Therapeutics, which is intended to be sent to "every member of the profession in Great Britain and Ireland." Of the numbers which were furnished me, the first bears date in 1856, and in its preface states that "it has not unfrequently happened that new remedies and

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preparations have been in use in the metropolis, on the continent of Europe or in America, for a long time before they have been generally known to, or adopted by the majority of practitioners." Even natural productions of value, it is said, "have never become available in practice, because no person has introduced them into commerce." The colleges, it is also urged, "only adopt into the Pharmacopœias remedies having a reputation already established, and, as a matter of course, these publications are always in arrear of the actual state of the art;" hence the establishment of this Company, as a "professional body," for the systematic advancement of therapeutics. I quote one of the arguments used in this preface, which is so novel that it may be interesting to the readers of this essay. "The imperfection and uncertainty which attaches to medicine, has had one cause very readily avoided. The preparation of medicine has been entrusted to a class of persons who, whatever may be their merits in other respects, make no pretensions to *understand the treatment of disease*, and who according to unquestionable testimony, either wilfully or negligently sell or employ in the preparation of prescriptions, spurious or adulterated drugs." It will be new to most pharmaceutists that a knowledge of the treatment of disease is requisite to an understanding of the preparation of medicines; and as to employing adulterated medicines in compounding prescriptions, both common sense and experience go to prove that a class who make drugs and preparations their chief or exclusive study, would be more competent to guard against this evil than those who add the cares of "general practitioners" to the legitimate practice of pharmacy.

This "General Apothecaries' Company" must not be confounded with the Society of Apothecaries established in 1617, and during two centuries known as the proprietors of Apothecaries' Hall, in London, to which metropolis their charter confines them. The Company now alluded to as owning several depots in the principal towns of the United Kingdom, appears to be confined in its operations to manufacturing and trading, and the Record of Pharmacy and Therapeutics issued from its central establishment in London, is chiefly an advertising medium for their preparations, which are, of course, recommended as of the best quality, and wholly free from adulteration. The pre-

face from which I have already quoted closes with the following significant remark : " As economy is an important consideration in the choice of medicines, *ceteris paribus*, the Company in this publication have not overlooked it; the reader is on this point referred to the articles *quinine* and *cinchona barks* and *rhubarb* in the sequel." On reference to these we find the *neutral* sulphate of quinine recommended as an improvement on the disulphate, on account of its perfect solubility. Sulphates of cinchonine and quinidine are favorably spoken of; ammoniated solution of quinine is spoken of as a very elegant preparation ; liquor *quinoidinæ sulph.*, dose 5 minims and upwards, is recommended as *superior* to sulphate of quinine, as an antiperiodic against fevers, &c. Citrate of quinine and iron of this make is said to contain 40 per cent. of citrate of quinine, a larger percentage than usual. Besides these, thirteen salts of quinine are spoken of ; under the head of Valerianate of Quinine, Dr. G. B. Wood is quoted as recommending a combination of Peruvian bark and valerian. I may remark here, that this eminent American authority is well and favorably known to the profession in Great Britain, where his book on "The Practice" is actually used as a text book in one or more of the colleges.

English rhubarb, of which I purchased a sample, of this Company, is recommended in "The Record" as very nearly identical in its therapeutic action with the foreign varieties ; it is stated that the best samples of English yield about 52 per cent of extractive matter to cold water, East Indian 53 to 54, and Turkey not more than 55 or 57 ; and that when the difference in price is considered, it will, it is trusted, be useful to general practitioners to be supplied with so cheap an article. Notwithstanding this statement and the alleged endorsement of Dr. Pereira, I found no reputable druggist and chemist willing to sell it as equal to the East India drug.

Among the new remedies noticed at this establishment my attention was particularly arrested by the pyrophosphate of iron in pseudo-crystalline scales ; this preparation is stated to contain a small quantity of citrate of ammonia, which renders it readily soluble in water, the solution being nearly tasteless and permanent ; it is recommended in doses of 3 to 10 grains, to be

given in water or a bitter infusion, in cases of obstinate anæmia, and diseases of which that condition is a symptom. I failed in making this beautiful product satisfactorily in the only attempt I have made to prepare it; I found it too adhesive and deliquescent to separate in scales, from the glass plate on which I poured the concentrated solution.

Most of the preparations advertised by this Company are already known in America, and many of them have been noticed in this Journal. *Glonoin*, "of guaranteed purity, and uniform strength," is among the remedies offered. *Chlorate of Soda* is recommended as a substitute for chlorate of potassa; it is said to be soluble in three parts of cold water, while the latter is soluble only in the proportion of 9 parts in 100 of water at 60°. *Iodide of Lime* is another of their novelties; it is sold in solution made by boiling iodine with milk of lime, which is said to contain iodide of calcium and iodate of lime; of the solution containing one grain of iodine to a fluid-ounce, the dose is 30 minims to two fluid-drachms; the peculiar adaptations of this salt, are said to be in the treatment of neuralgia occasioned by mercury, lead, &c.

From Liverpool let us next turn attention to Edinburgh, the chief seat of science in the North. The University is just about to close its summer course, and thither, across the deep ravine that divides the town, we wend our way. The purposes of this essay forbid a description of the ancient castle, with its legends of daring emprise, and of the quaint old buildings with which it is surrounded, hallowed by many a thrilling story of the early times—of the church where John Knox thundered, the house in which he resided, and the spot where his bones moulder, though these are all in the old town, and in the vicinity of the object of our search. For nearly three hundred years, the University of Edinburgh has dispensed the benefits of a liberal education to the numerous students who have annually resorted to "the modern Athens," and for the last half century has enjoyed a reputation inferior to no other institution of learning in Great Britain. In medicine, especially, it has excelled, and hence is especially worthy a short notice in our Pharmaceutical Notes.

The present ample building, which was commenced in 1789, is a plain and very substantial structure, forming a parallelogram

enclosing an open court. It contains lecture rooms, class and reading rooms, museums, and a library. The museum of natural history contains a great variety of natural objects, and especially a fine collection of birds; some of the cabinets can be only partially exhibited for want of room. The Library, which contains about 100,000 volumes, is chiefly arranged on either side of a hall near 200 feet long, containing, among other objects of interest, a beautiful statue of the Scottish bard, who, though no great advocate of learning, which his own humble education and the peculiar bent of his genius, scarcely prepared him to appreciate, has made an indelible impress upon the literature of his native land, and has given to Scotia, even in far off America, the synonym of *the land of Burns*. In the four faculties of theology, law, medicine, and art, there are thirty-two professors; of these, I believe, only three or four, who are connected with medicine and its collateral branches, lecture in the summer.

I had the pleasure of listening to Dr. Allman, Professor of Natural History, during one of his lectures on Physical Geography. By a curious coincidence, he was describing the great plains on the American Continent, and gave an eloquent description of prairie scenery, which aroused the class into a burst of applause. The Professor invested his whole subject with a more rhetorical and graphic character than is customary on such occasions, and being dressed in a gown in token of the dignity of his office, struck me as in strong contrast to his colleague, Dr. Goodsir, one of whose summer lectures on Comparative Anatomy, I heard; portions of the skeletons of the snake, the bird, and the reptile, were described minutely; the specimens were, however, too small to be readily seen by the class, and the description was devoid of ornament or illustration. The museum of this department is very extensive, especially the exquisitely prepared injections, illustrating minute structures. The arrangement for preserving dead bodies for dissecting purposes, appeared an improvement on any I had seen. Large wooden boxes are lined with thick plates of unpolished glass, cemented at the corners and ground on the edges to fit the top, which is similarly lined and readily moveable. They are said to serve an excellent purpose. The dissecting rooms of the University are ample, commodious, and well supplied with disinfecting facilities.

Both the eminent naturalists just referred to, were familiar with the name and fame of Professor Leidy of the University of Pennsylvania, and inquired after him with much interest, on being introduced to a Philadelphian.

Prof. Christison was not lecturing at the time referred to, but through the good offices of my friend, Dr. Sandahl, of Stockholm, whose objects of study accorded closely with my own, I enjoyed an opportunity of visiting with him the splendid cabinet of *Materia Medica*. Each of the leading drugs may be said to constitute a separate cabinet, so numerous and varied are the specimens. The Opium series may be specified as one of the most interesting; that of English make was shown as equal to any other; the India variety, so extensively sold to the Chinese, is very uniform, and quite inferior. The Kino series contained numerous specimens; the Jamaica variety was pointed out as very inferior,—“a mere extract.” The numerous tinctures of kino all appeared to have gelatinized, equally, by time. The Cabinet of Poisons as would be supposed from the extended reputation of Prof. Christison as a toxicologist, is extensive and complete. Of the various methods of mounting wet specimens tried by Dr. Christison, he prefers the use of a solution of common salt, the vessel to be tied over with varnished paper.

At the Infirmary, a large hospital opposite the University, we saw an amputation performed by Dr. Spencer, assisted by Dr. Gillespie; the operation was protracted, but accompanied throughout by the inhalation of chloroform. The surgeons and attendants were surprised to learn that in America ether is still used in many of our Hospitals and in private practice, as a safer and better anaesthetic. They use Duncan and Flockhart's chloroform, and for the sake of economy prefer that made with methylated spirit, instead of pure alcohol. It is a common idea, by the way, that the ill effects sometimes experienced from the use of this anaesthetic are often attributable to its bad quality, from want of proper rectification to free it from the impurities which come over in the first distillation.

The Botanical course of the University being in progress at the Botanical Garden in the suburbs of the New City, I gladly availed myself of the opportunity to visit this delightful spot at the hour of Prof. Balfour's lecture, which, as in the case of the

similar course in London, begins at 8 o'clock, A. M. The attendance was large, perhaps exceeding 100. The whole class numbers about 200, but many were absent owing to the Course being near its close. Prof. Balfour, who is widely known as a botanist, is a rapid speaker, with scarcely enough volume of voice for so large an apartment, but the subject was illustrated with a wonderful profusion of diagrams, and specimens of living plants. Monocotyledons, Smilaceæ, Orchidaceæ, &c., were described, and considerable attention given to the subject of the pathology of plants. The excrescences from insect stings, ergot, dry rot, potato rot, &c., were treated of, also, the remedies to be applied to prevent the progress of these diseases. Some parts of the lecture were rather unsatisfactory, from the disorder and want of attention of a few of the class, who were at more pains to gratify an unseasonable playfulness than to avail themselves of the opportunity of acquiring knowledge. The Museum connected with this fine Botanical school furnished us an object of study during the breakfast hour of the Professor. It contained specimens of several departments of natural history, and was occupied by two or three young gentlemen engaged in original microscopic investigations.

A party of fifteen students was organizing, to accompany the Professor, at the close of the Course, on a botanical excursion to Switzerland. The arrangements made were admirable for economy, much of the travelling being on foot, and the luggage and personal accoutrements being confined to such as were absolutely necessary, each student, of course, carrying a suitable tin case or portable press, for preserving specimens of the Alpine plants, collected by the way.

It was with reluctance that I denied myself the proffered pleasure of joining this delightful party at Berne, to walk with them over some of the most beautiful scenery in the world, in quest of trophies which would have had an additional charm from the circumstances in which they were obtained.

An hour spent in the Edinburgh Botanical Garden, will long be remembered as full of interest. It is one of the most beautiful spots in this beautiful country, and to the natural advantages of the location are added embellishments of perfect taste and liberality. A splendid palm-house, recently erected at an

expense of \$60,000, contains a magnificent collection of tropical trees,—some of them of great age,—growing under glass, and maintained in a suitable atmosphere at great expense. A high tower, containing a water tank for supplying the establishment, commands a fine view of the adjacent city, and its suburbs, with Leith and the distant sea. The hot-houses contain vast collections of curious and interesting plants, some of them now displaying their brilliant flowers. Among the curiosities shown us by the Professor and the scientific superintendent of the Gardens, were true *Narthax Assafotida*, a rather sickly plant, which had been nearly killed by cold to which it had been accidentally exposed; *True Quassia*, a small, but thriving plant; *Gamboge*, which on being punctured with a pin emitted a bright yellow very adhesive exudation; *Cinchona Calisaya*, as yet a small specimen; a large *Sago Palm*; a *Matico* plant; and our own *Poke*, *Phytolacca Decandra* growing in the open air, and looking very familiar among strange associates collected from the four quarters of the globe.

Prof. Balfour had just received a specimen of the *Malapterurus* or thunder fish of the Arabs from Calabar, Africa, and before liberating it from the globular bottle in which it had travelled so far, gave us an opportunity to test its *shocking* powers. The shock is so nearly identical with that of an electrical machine, that I had no difficulty in understanding how this comes to be classed with electrical fish. This specimen is about the size of our common river catfish, and much the same shape and general appearance.

The interest which attaches to the Edinburgh University and Botanical Gardens, especially to an American, long accustomed to associate the former with some of the most eminent of philosophers and quite unused to such attractions as the latter affords, has beguiled me into these details, and prevented my approaching earlier the Pharmaceutical matters pertaining to this locality.

The most interesting item to me, in this connection, was the introduction to a valued acquaintance, in the person of John Mackay, Chemist and Pharmaceutist, local Secretary of the London Pharmaceutical Society, to whose kindness I am indebted for much information on matters pertaining to our profession.

The rooms of the Edinburgh Pharmaceutical Society are pleasantly located, and contain a neat cabinet, mounted somewhat in the manner referred to in describing the Liverpool Cabinet. The most novel and interesting specimen was a nest of large and perfect crystals of *Alain*, deposited by T. & H. Smith, of Edinburgh, the discoverers and manufacturers. This neutral crystalline principle, which has hitherto been known only by reputation in America, and the utility of which, as a remedy, has been doubted, is among the most beautiful of the organic proximate principles. It is considerably used as a mild, though tolerably certain cathartic, in doses of 1 to 3 grs. From the same manufacturers an elegant specimen of caffein was displayed in large silky tufts. The assortment of Cinchonas has been augmented by contributions from Prof. Christison, who has remembered the collection in disposing of many duplicates. Among the articles deposited by Mackay were some Egyptian Lentils, a very cheap and highly nitrogenised article of diet, which seemed worthy a more general introduction to use.

Before leaving Edinburgh, I should speak of the gelatine manufacture, which is here carried on pretty extensively by J. & G. Cox who send large quantities of the article to America, where it is almost universally sold by pharmaceutists and grocers. John Mackay's pure extract of calves feet is designed as an improvement, being warranted to be obtained entirely from fresh calves feet, obviating the objection, of many physicians and nurses to the materials from which the ordinary gelatine is said to be obtained, while the jelly it yields possesses a richness and softness to the palate in which jellies made from gelatine are usually deficient.

Pharmaceutical organization is not in so great esteem in Scotland as in some parts of England. The Chemists and Druggists are, many of them, in a small way of business, and the payment of five guineas initiation fee operates as a great objection to their becoming members of the London Society. There is no School of Pharmacy in Scotland, and the number of students who qualify themselves to appear before the Examining Board located in Edinburgh, is small. This is the more remarkable, from the known qualifications of some of the pharmaceutists to teach, and from the presence of the University with its elevating and inspiring influences.

The general practice of pharmacy seemed to me to compare favorably with that of any place I have visited, although the scale of prices for dispensing is much too low to be remunerative, except to the few who are well established. None of the licentiates of Apothecaries Hall practice here, and the term apothecary has a different meaning from that applied to it in London. The pharmaceutical shops are much in the London style, no handsome displays in front, but well furnished and complete within.

Leaving Edinburgh for a sojourn among the Highlands, during which I enjoyed a fine opportunity of studying the character and habits of a large party of Scotchmen, all bent on pleasure and recreation, I found myself in a few days at Glasgow.

Besides being a great seat of commerce and manufactures, this city is distinguished for its institutions of learning. Glasgow University College is a more ancient and venerable building than that of Edinburgh, and scarcely inferior in extent. The only parts accessible to a stranger at this time being the Senate Chamber, a long, narrow room, the stone steps at the entrance guarded by a lion and unicorn, the walls covered with curious and unique wainscoating, and furnished with cases and tables of massive proportions,—and the Hunterian Museum, which is a separate building in the rear of the University.

This museum which is open to the public on the payment of a small fee, embraces an extended series of natural history specimens, a fine old library of the celebrated Dr. Wm. Hunter, a collection of paintings by old masters, some statuary, and a variety of antiquities. This is the only public museum that I know of, frequented by both sexes, that contains a complete series of anatomical preparations, monstrosities, specimens of the foetus in utero, and the numerous objects required in the illustration of a course of medical instruction; six or eight very large obstetric manikins were conspicuously displayed.

This University has recently paid a deserved compliment to American genius in the appointment of Prof. H. D. Rogers, to the chair of Natural History, though this distinguished teacher had not, at the period alluded to, entered upon his duties. There are ten professors in the medical department: one in theology eight in literature and philosophy. Of these, only two were

lecturing at this late period in the summer,—the Professor of Botany, at the Botanical Garden, which I found a pleasant place to visit, but did not hear a lecture; and the Professor of Chemistry, who holds his lectures in a building near the University, containing the practical laboratory. This place I found one of great interest, the arrangements for instruction in practical chemistry being more than usually complete, and each table having, all the necessary apparatus and material, even including a separate basin and hydrant.

The importance of Summer instruction in Practical Chemistry seems to be recognised both here and in Edinburgh, although in the latter place, the laboratory was closed during my recent sojourn, perhaps on account of the lamented death of Dr. Gregory, whose place had but recently been filled. I heard the last lecture of the Summer course at Glasgow, the plan of instruction being novel and, I believe, peculiar to this institution. Two courses are conducted simultaneously, each class being limited to thirty. Upon narrow shelves or tables in front of each row of seats are arranged for each occasion, the necessary apparatus for experimenting upon the particular subject of the lecture, four or five students operating together, so that to a class of thirty, six or eight sets of apparatus are required. The exercises commenced with a general examination upon the subject of the previous lecture, after which the lecturer introduced the subject of Carbonic Oxide, explaining the method of preparing it, and the rationale, while his assistants at the counter, and the several groups of students, each with a retort and small pneumatic trough, proceeded to generate and collect the gas. He then explained its properties and the methods of testing it, which were verified by the students with their several specimens. This method, though it has its advantages, seems imperfectly adapted to supersede laboratory instruction; the attention of the students is too much divided between the explanations of the teacher, and the details of the experiment, while a single error in manipulation by any one student, leading to a slight explosion, the fracture of a retort, or other accident, by distracting the attention of the whole class may break the thread of the instruction, and to some extent, defeat the object in view. This idea is the result of a single observation; it is cer-

tainly a great desideratum to teach experimental chemistry by a more popular and economical way than that ordinarily pursued in laboratories, and I was anxious to find in this an improvement on other methods. Would it not be better to separate the lecture from the manipulation, devoting a certain time to each, adopting the same plan of grouping the students into classes, but teaching the manipulations to each group separately?

It would not be just to the course of instruction upon which I have thus ventured to comment, to dismiss it without acknowledging the general familiarity of the class with the subject of the examination, the apparent efficiency of the instruction so far as the plan admits of it, and the great advantages furnished to those who availed themselves of the privileges of the practical laboratory. I shall always regret that for want of a personal acquaintance with Prof. Anderson, and an attendance at a more favorable period of the course, I missed of a better acquaintance with this method, aiming, as it does, at the simplifying and economising the now expensive and tedious instruction in Practical Chemistry.

The Andersonian University is another Glasgow school, having a good building, a tolerable museum, open to the public, (fee one penny,) and a practical laboratory. Dr. Penny, the professor of Chemistry was absent, and no course of lectures was in progress. This laboratory was furnished in a much cheaper style than that of the University; the fees being only one guinea (\$5 25,) a month, exclusive of the apparatus which the student is obliged to purchase for himself, and may keep in a separate closet, together with the products of his manipulations. Here, as in the University laboratory, gas is the chief fuel used, though instead of cylinders covered with wire gauze, such as we use, they employ cylinders open at both ends, tapering toward the top, and standing on wire feet. The tripods for holding capsules and crucibles were made by taking three pieces of wire of equal length, bending them twice at right angles, and binding them together with fine wire. This Institution is of a popular character, having scientific courses of six months' duration, adapted to apprentices as well as students qualifying themselves for the professions. During a short stay in Glasgow, I met with one illustration of its advantages, not only in inspiring

a love of chemistry, but in imparting its leading facts and principles ; the lad who pointed out to me some of the facts which follow, was educated at this Andersonian school, and now finds employment in the largest chemical works in the world.

Every one has heard of Tennant's great Chemical works, and such a description of them as my opportunities enable me to give may not be uninteresting. They are situated in the eastern part of Glasgow, in a suburb called St. Rollox, on a rail road which passes directly through the grounds, and a canal which skirts them. The works cover in about sixteen acres under roof, and their enormously high chimneys as I first saw them from the top of Ben Lomond, many miles distant, constituted one of the most conspicuous objects in the panorama of Glasgow.

The principal chimney is four hundred and sixty feet high, seventy-five feet higher than the top of St. Paul's, and even exceeding in height the tallest of the pyramids of Egypt. There are two other tall chimneys, one, three hundred and thirty, and the other two hundred and fifty feet high. They are built of brick, the largest being forty feet at the base. The object of such immense altitude in the flues is to carry the gaseous products so high in the atmosphere as to prevent inconvenience to the surrounding population.

These works are more remarkable for the vast quantities than for the variety of the chemicals produced. The chief articles of manufacture are Soda Ash, Carbonate of Soda, Muriatic and Sulphuric Acids, Bleaching Salts, and Soaps.

By the action of sulphuric acid on chloride of sodium, sulphate of soda is produced ; the muriatic acid given off is passed into large, square, stone chimneys, lined with pitch and filled in with charcoal. Near the tops of these are reservoirs, from which jets of water are thrown into the flues, which dissolves the gas in such large proportion that the liquid as it trickles out below has acquired the strength of commercial muriatic acid, and marks a sp. gr. of 1.116. The tops of these chimneys emit no smell of the acid gas.

For the manufacture of bleaching salt, the muriatic acid is converted into chlorine by the use of black oxide of manganese ; the gas is then conveyed into a series of brick chambers containing the lime ; two of these communicate, and after two

days the chlorinated lime is taken out of one, the other being filled with fresh, and so on alternately, each charge being thus subjected to the gas for two days. The workmen exposed to the action of this corrosive gas in the operation of charging and emptying the chambers, appear to become so habituated to its effects as to live, judging from one specimen we saw, to a great age. The delicate tissues of the lungs and the lining membrane of the air passages, resist for years a corrosive action which completely destroys the teeth.

The oxide of manganese, after serving its purpose of decomposing the muriatic acid, exists in the state of chloride; this is restored again to the condition of oxide for future use, by the following process:—it is first treated with lime, by which the iron is separated, and then with carbonate of lime which precipitates carbonate of manganese; this, by calcination, is converted into oxide for use again in the decomposition of muriatic acid. This process is a patent belonging to the concern, and the invention of one of the partners.

The manufacture of sulphuric acid is carried on by a process, which is also, I believe, original with a member of this firm. The sulphur is burned in small furnaces, communicating with a large horizontal pipe; into this is poured near one extremity, a peculiar acid mixture or compound called nitro-sulphuric acid, consisting of concentrated sulphuric acid saturated with nitric acid.

When mixed with water this liquid has the property of giving off nitrous acid in profusion, and being discharged with water into the tube containing gaseous sulphurous acid, converts it into sulphuric acid; this runs off into iron vats lined with lead which are heated till it is concentrated to a certain specific gravity; these vats show a deposite of sulphate of lead, which, to a great extent, protects them from the action of the acid. The acid is now run into a platinum still, which is placed over a very hot fire, and the concentrated acid, as it runs off, is cooled by passing through horizontal troughs of water, and into leaden cold water baths. The method of throwing the acid into receiving vessels in convenient positions for filling carboys without the aid of a pump, is by the pressure of air forced into the tubes.

From the sulphate of soda left after the liberation of muria-

tic acid from chloride of sodium by sulphuric acid, the several alkaline products are made. The sulphate is mixed with charcoal in suitable brick furnaces and ignited, being constantly stirred with large iron rakes during the burning.

It comes out a fused yellowish mass, which is broken up upon the hearth, lixiviated repeatedly, concentrated in iron vats; for soda ash the evaporation is carried on to dryness, calcined and powdered; it meets a ready sale and is one of the chief productions of the works, averaging about two hundred and fifty tons per week.

The sal soda is produced by arresting the concentration at a certain point and running the lixivium into shallow iron vats, on the top of which, wooden strips are thrown, to promote crystallization, and after the carbonate of soda has been nearly all separated in this way the mother liquors are drawn off, by removing a plug, and evaporated to dryness, forming another quality of the soda ash. The yield of sal soda is about one hundred and fifty tons per week.

The vast extent of the crystallizing room, with its numerous large vats, and the immense expenditure of force silently exerted by innumerable material atoms, marshalling themselves with mathematical precision into regular crystalline forms, is calculated to fill the mind with astonishment and admiration, and I shall long recollect it as one of the most impressive exhibitions of natural motive power it has been my lot to witness.

Part of the soda ash is rendered caustic by quicklime and consumed in another part of the works in the manufacture of soap. Tallow mixed with palm oil and cocoanut oil, both of which latter are abundant in England, are used in the soap works. The boiling is accomplished by steam, in the usual way, about sixty tons of a very nice white soap being produced weekly. From what I observed in this branch of manufacture here and elsewhere, I do not think soap-making in England at all in advance of the art in our own country.

The practice of pharmacy in Glasgow seemed to present little to distinguish it from that of Edinburgh or the principal towns of England. Many of the stores are large and well furnished and present every appearance of a prosperous business. The term apothecary is applied, as with us, to the regular profession of pharmacy, and seems to convey no idea of a practitioner of

medicine and surgery. Within a few hours' ride by rail road, however, at the towns of Carlisle, Penrith, Ulverstone, &c., I found the prescription business very much in the hands of the surgeons and general practitioners, and the pharmacists reduced to the level of dealers in drugs, domestic remedies, and household articles, including tea coffee and "sweets;" as a consequence of this, the practice of the art is less thorough and scientific, and the people are the losers.

(To be continued.)

ON THE PRESERVATION OF FLUID EXTRACTS.

BY JOHN M. MAISCH.

Of late there has been some discussion in pharmaceutical circles concerning the most appropriate agent for preserving those valuable preparations, the fluid extracts. The tenor of these discussions makes it evident that the opinion has been gaining ground in favor of alcohol as the best menstruum, and in preference to an aqueous solution of sugar. The reasons for this preference are principally twofold; 1, that alcohol is a solvent for all medicinal principles produced by organic life; and 2, that alcohol is a more powerful antiseptic than sugar.

The first allegation is a hypothesis of Mr. W. S. Merrill, which, though no positive proof for it has as yet been attempted, still has the appearance of being a fact in a large majority of cases, although not a universal law. I do not intend now to speak about this, but merely remark that, so far as it is true, its greatest influence would be exercised on the method of preparing the extracts, and more particularly on the menstruum employed during that process, so that water would be more or less entirely dispensed with. The mere fact of the medicinal virtues of a plant being extracted by alcohol, does by no means exclude the possibility of preserving these principles in an aqueous liquid by means of sugar, so long as it has not been demonstrated that water or solution of sugar, is no solvent for them, or rather after it has been proven that they are soluble in such a liquid; if insoluble, of course, that menstruum is inadmissible.

The second reason has been advanced and argued by Mr.

Thayer, but I believe it does not cover the whole of that ground which he has assigned for it. It is doubtless true that the presence of a certain proportion of alcohol tends to prevent, or, where it has commenced, to arrest the progress of vinous and even acetic fermentation, but vegetable matter of itself will not undergo these changes, unless principles are present which are able to act as fermentes. Therefore, if we could succeed in removing such fermentative matter, the liquid, whether alcoholic or aqueous, could not undergo either fermentation. Of this matter, however, as it occurs in different plants, we know as yet too little, and in nearly all cases we will for this reason be deprived of the means for removing it.

But on the other hand, vinous and acetic fermentation are not the only alterations to which organic matter is subject, a transformation of the elements and consequent change taking place wherever the air has access, but under different circumstances this change will be different. Berzelius, on speaking of the metamorphoses of organic bodies, uses the following language : " Mixed organic bodies, when moist and at a certain temperature left to themselves, undergo changes, the end of which appears to be to decompose them into other combinations of the elements, and ultimately after a shorter or longer period, to transform them into inorganic compositions." And again in another place : " Nature's aim, it seems, is, not to grant stability to anything of an organic composition, but to gradually destroy it. Bodies that are perfectly pure, may in the solid state be kept unaltered, and in most cases for an indefinite period, oftentimes, their being surrounded by or dissolved in water, has no destructive influence on them. But if two or more bodies are mixed and exposed to the influence of moisture and air, a process of metamorphosis is induced," &c.

The change in the organic matter is caused by oxygen, it is an oxidation to which as we notice it in ordinary life accompanied by different phenomenon, we apply different names. Mould putrescence, fermentation, &c. are such changes, at the same time accompanied by the development of organic life. Alcohol has the power to prevent or retard these changes, and the cause for this power may be easily illustrated by the following well known simple experiment. Wet a beef or hog's bladder thoroughly with

water, and then dip it in alcohol, it will be dry instantly. The whole secret is, alcohol has the power of abstracting moisture from membranes and all similar substances, and in every instance mentioned by Mr. Thayer is this its office; the unpeeled nutmeg, the fresh pear, the fermenting currant wine, the anatomical preparations and the fruit preserves are thus by alcohol preserved against further decomposition; it is in this way that alcohol kills the vegetable life of the process of fermentation, that it destroys the proneness of animal matter to putrefaction—and this property is what we term the antiseptic power of alcohol.

But there are other forms of oxidation which do not announce themselves by the appearance of foreign organic life; they progress silently and uninterruptedly when once begun, as long as the necessary materials have not been used up. Though these changes are less visible, nevertheless we must assume that medicinal organic bodies by oxidation, that is by an alteration of their chemical composition, likewise alter more or less their medicinal properties. Whichever way we look upon the various processes of deterioration, we will always find oxygen to be the powerful enemy we must try to conquer in keeping all our pharmaceutical preparations. We therefore inquire which of the common menstrua used in pharmacy are most apt to assist in the process of oxidation, which do most readily absorb the atmospheric gases?

If we look to the phenomenon presented by liquids before the process of boiling, we can partly receive a clue to an answer. Liquids, when they expand by the application of heat, gradually lose the power of retaining gases in solution, and long before they begin to boil, small bubbles form in different parts, but more especially in the neighborhood and directly above the source of heat, where the temperature is highest: these are air bubbles, which have nothing to do with the phenomenon of boiling, which takes place after a considerable quantity of air has been ejected. Now by watching liquids being heated in glass vessels to a certain temperature, the number and size of those bubbles will enable us to form a tolerable estimate of the proportion of air absorbed. Such a rough comparison, of course, will never approach to scientific accuracy, but will be sufficiently so for experimental use. Alcohol and ether if at a low tempera-

ture allowed to absorb a gas such as air, and afterwards heated to about 85 or 90° F. evolve the gas, but alcohol in smaller proportion than ether; the same is the case with alcohol and water, at about 160° F., the air is ejected from alcohol in larger proportion than from water.

However, on this very subject we have scientific researches by Saussure, jun. He established the fact that, even by a long continued boiling, no liquid could be absolutely freed from the gas it had previously absorbed, but liquids with higher boiling point easier and more complete than those boiling at a lower temperature; the difficulty to rid our pharmaceutical menstrua of atmospheric air must therefore be greatest with ether, less with alcohol, water, and I may add syrup. According to Saussure, 100 volumes of the following liquids, freed of air as much as possible, are able to absorb the following volumes of gases, viz :

Water,	106 CO ₂	6.5 O,	4.2 N
Alcohol,	186 CO ₂	16.25 O,	4.2 N
Absolute alcohol,	260 CO ₂		
Ether,	217 CO ₂		
Syrup containing 25 pr. ct. sugar,	72		

With regard to the resorbent quality of liquids, Berzelius gives the following general rules: The capacity of liquids for the absorption of gases increases in general with the decrease of their specific gravity, and with very few exceptions this capacity is lessened by the presence of a salt or other body; the more soluble this is in the liquid, or the more of it is dissolved in a given measure, the smaller is the resorbent power of the liquid, or in other words the absorbing capacity of solutions is lessened by the increase of their specific gravity. The little table above is a strong evidence against the practicability of the use of alcohol, which absorbs 2½ times more of oxygen than water, and probably 5 times more than an equal volume of syrup. Alcohol therefore is the very liquid that furnishes the principal conditions for the convenient oxidation of vegetable substances, ready mobility and sufficient oxygen. Only in appearance, the experience of every day life is at variance with this assertion; for above it was shown that alcohol arrests putrefaction and fermentation merely by destroying vegetable and animal life, for the successful continuance

of which water is one of the paramount conditions. An arrest of one way of decay, does, however, not indicate the aptitude of alcohol to do the same in every direction, and proofs can be furnished that notwithstanding the presence of alcohol changes of organic matter do take place. Let every pharmacist examine his tinctures, any and all of them, and he will find, no matter how nice and clear they may have been directly after they had been finished, that after more or less time in ordinary contact with the air, such as is afforded in the common course of our business, that they have formed precipitates, from the minute and pulverulent settling of tincture of cardamom, cantharides, gentian &c., to the more bulky and curdy sediment of tincture of krameria, the resinlike precipitate of tincture of bark, aloes, &c. or the gelatinous mass of tincture of kino. But it may be argued that if the alcohol had been substituted by water, the decomposition would have gone much further. This assertion is true, but with this difference, that the decomposition would have been in another direction, moulding, putrefaction would have taken place, water would have extracted quite different bodies, glutinous and albuminous substances which easily decay and necessarily lead all organic matter with which they are in contact to the road of destruction.

I have no intention of attempting to prove a superiority of water over alcohol as a menstruum, for in the presence of the former alone every conceivable way of decay may take place, while by alcohol two or three are excluded, and this is the real advantage in using it as a pharmaceutical menstruum. The issue, however, is not between water and alcohol, but between syrup and alcohol; and here let us look at some every day occurrences in the pharmaceutical store. Syrup of rhubarb is made with an alcoholic menstruum of half the strength of that employed for the tincture, and must necessarily contain a larger amount of gummy matter; the latter being about one fifth stronger, if well made, will soon throw down a sediment, while the syrup, if made in accordance with the *Pharmacopœia*, may be kept almost indefinitely without precipitating, its chief enemy being a very low temperature, when the sugar will crystallize. Wine of ipecacuanha likewise separates a sediment which does not occur in syrup of ipecac, which is only of half the strength of the

former, but made with a different and more spirituous menstruum. But a more striking illustration of the preservative power of sugar may be produced by the following experiment.

Let us prepare Liquor Ferri Iodidi in the manner prescribed by the Pharmacopœia ; for another quantity we omit the sugar and wash the filter with 95 per ct. alcohol instead of with water, until the required measure is obtained ; thus we procure a solution of iodide of iron in alcohol of 72 per ct. of the strength of the liquor of the Pharmacopœia. We put equal measures of the two solutions in two vials of the same size and shape, cover their unstoppèd mouths with gauze so as to prevent the falling in of dust, and set them aside in a place where the direct sunlight cannot reach them. Thus placed in as nearly as possible alike conditions, the progress of oxidation may be easily watched and compared without disturbing the vials and mixing the different strata. It will be observed, that in less than two hours the liberation of iodine has fairly set in, in the alcoholic solution, while the saccharine liquid apparently shows no signs of decomposition yet ; in this the coloration by the liberated iodine very slowly proceeds downwards, the former has in 12 hours precipitated some sesquioxide of iron and in a few days has assumed a uniformly deep iodine color.

But now let us proceed in the opposite direction. We have two similar vials, one filled with a saccharine, the other with an alcoholic solution of iodide of iron of the officinal strength, both however in such a state of decomposition that the shade of their coloration is alike, so that it may be fairly assumed the oxidation has proceeded equally far with both solutions. Let them be exposed to the direct sunlight under similar conditions, and in such a manner that both may be easily examined. The saccharine solution, which was slowest to assume the coloration, rapidly approaches to colorlessness, while it takes a much longer time for the spirituous liquid.

Both these experiments tend to show that sugar is a better preservative and a better deoxidizing agent than alcohol ; and once come to this conclusion, we must acknowledge it as desirable to preserve our fluid extracts as much as possible by means of sugar. Our aim then will be to counteract the proneness to fermentation, which in many cases we can easily achieve by the ne-

cessary quantity of sugar which of itself protects sufficiently the vegetable matter against oxidation in general, that cannot be avoided by the use of alcohol, this antiseptic itself having a tendency to undergo acetic fermentation through the influence of sundry vegetable substances. One great objection, and I think, a more serious one than fermentability, is the different degree of solubility of sugar in water at a temperature of such variation as is experienced in our climate during the summer and winter season when it verges almost on impossibility to maintain constantly in a given space a temperature of about 60° F., which has been found most salutary for syrups. Fluid extracts, of course, ought to be made to withstand these changes as far as they are felt inside the house, in the cellar, and in the dispensing room. A saccharine fluid extract, containing in a pint 12, never over 14 ounces Troy of the best sugar, is not apt to crystallize in moderately cold weather, and as it is charged with a considerable amount of vegetable matter, it will then generally be nearly of the density of our ordinary syrups containing 15 oz. Troy of sugar in one pint. The exact quantity of sugar necessary for preservation, and particularly to resist fermentation, varies in different cases, those plants yielding a large amount of soluble matter requiring less sugar than those yielding but little. I differ from M. Thayer's opinion, that because containing more vegetable matter —natural ferment as he calls it—saccharine fluid extracts are more liable to undergo change, fermentation; on the contrary, the nearer the density of organic matter approaches solidity and dryness, the less is its proneness to such a change, and infusions of a marked difference in their strength, made alike and placed under the same influences, will show the weaker to change before the stronger, but more especially will this be the case when the weaker infusion has been concentrated by evaporation and filtered.

Thus far I have spoken of the preference of sugar over alcohol from a chemical point of view, and the question remains now to be reviewed in a pharmaceutical light, concerning appearance and taste.

With some well known exceptions, a liquid medicine is the more pleasing to the eye, the more transparent and clear it is. Those rendered turbid by some partially soluble substance, are

generally unsightly and in some cases even repulsive. Whenever it is in our power, we owe it to the suffering to remedy this defect by making the medicine as transparent as possible. Alcoholic tinctures when freshly prepared, are unexceptionable as far as their appearance is concerned, but above I have shown that they are subject to changes and form precipitates. This is admitted by M. Thayer, but he thinks this tendency is less in fluid extracts than in tinctures, doubtless so on account of their specific gravity being higher. I have had little experience with alcoholic fluid extracts, a few instances excepted; but if I am to judge from them and the conclusions of the above stated well established facts, it appears to me that they all must soon precipitate, and though the precipitate be light and more pulverulent, and may by agitation be easily mixed with the extract, still this does not improve their appearance, but certainly renders them more or less unsightly.

In making fluid extracts, the obtained tincture or infusion during the process of evaporation is heated for such a length of time, that by contact with air a partial change is unavoidable; the darker color of the liquid and sometimes the portions of insoluble matter floating therein are evidences thereof. The addition of sugar in such cases, may, by its own solvent powers, dissolve some, or keep that extractive matter suspended for a time; but if suspended only, it is sure to separate and thus detract from the nicety of the preparation. This result may be avoided by straining the fluid extract before the addition of the sugar through close flannel, or better still by filtering it quickly through good filtering paper, while yet hot, and washing the filter subsequently with hot water to make up for the loss suffered by evaporation. The separation of apotheme from the fluid extracts ought to be a necessity, as it contributes nothing at all to the medicinal properties of the preparation, and as it is a substance in the process of alteration, it most likely interferes with the stability of the fluid extract. Alcohol is a better solvent for this substance, which consequently enters greatly into the extracts preserved by alcohol, without adding to their stability.

Besides apotheme, during evaporation other bodies may be separated, particularly chlorophyll and resin; the first of the two we had better get rid of in all our preparations, with the latter,

however, it may be different. If the separated resins are of any medicinal value, we must, to preserve them, dissolve them if possible. When all medicinal virtue resides in resinous matter, it may be most practicable to have them dissolved in alcohol; but it is often the case that only small quantities of resin are present, which nevertheless will not be kept in solution by the sugar. To retain it we have various ways, one of which is recognized by our national Pharmacopœia in the case of fluid extract of senna and spigelia. I refer to the employment of an alkali or its carbonate, to effect the solution, which has also been proposed by Professor Procter for fluid extract of jalap, and may be serviceable in other instances.

Another way is the partial employment of alcohol as a solvent, as a precedent to which I refer to E. Parrish's suggestion for fluid extract of cinchona (*Parrish's Practical Pharmacy*, p. 171.) If the sugar is dissolved by a very moderate heat, and the evaporation to the proper measure conducted at the same temperature, a sufficient quantity of alcohol will remain behind to keep the cincho-tannic salts in solution. The fluid extract thus made is syrupy, perfectly transparent, of a deep Malaga wine color, and, in the course of 18 months, being kept in a partially filled bottle frequently opened, has not precipitated one-fourth the quantity of coloring and other matter, as an equal volume of the tincture of cinchona, made with the same calisaya bark, and being only three-eighths the strength of the fluid extract. I believe this to be a speaking example in favor of the employment of sugar. As, however, by manipulating differently or at a different degree of heat, the amount of alcohol must necessarily vary, it might perhaps be preferable to have a certain quantity added to the completed extract, say about 2 oz. for the pint. Since then I have prepared various extracts in a similar manner, such as fluid extract of cimicifuga, serpentaria, buchu, &c.; in the latter instance, however, I have been unable to separate entirely the chlorophyll; the quality of such extracts I believe to be unexceptionable.

Another consideration, not to be disregarded in making fluid extracts, is their taste, and to make this as agreeable as possible, is a duty which we owe to the sick. This end is gained by sugar, which more readily masks a bitter and disagreeable taste

than alcohol, and though by age preparations made with the latter menstruum are improving in taste, become mellow, this is not a quality belonging exclusively to alcohol. Although we observe it less, it is also the case with saccharine fluids; to prove which I may refer to syrup of rhubarb, but more particularly to the finer fruit syrups, such as raspberry, mulberry, strawberry and the like. Where the taste is very disagreeable, or the odor an unpleasant one, we can resort to volatile oils, which serve to correct both odor and taste, and at the same time act as antiseptics similar to alcohol. If the list of our officinal fluid extracts should be increased at the next revision of the Pharmacopœia, it will doubtless include a number of herbs which have a peculiar odor of their own, residing in a peculiar volatile oil, to gain which by a process as simple as possible must be our aim, so as to be able to incorporate it afterwards with the finished extract.

I have hardly anything to say in opposition to the argument that the small quantity of alcohol taken with spirituous fluid extracts can not have any stimulating effects. When the extract is preserved by diluted alcohol, and the dose does not exceed a teaspoonful, I am in general inclined to the same view; but it is quite different with fluid extracts preserved by 85 or 95 per ct. alcohol, and when the ordinary dose is larger. With a dose of such fluid extracts, which, besides being preserved by sugar, contains some alcohol, for the complete solution of resinous and other matter not entirely soluble in syrup alone, such a small quantity of spirit is given that it could be even less objectionable than the quantity in a dose of fluid extracts preserved by alcohol or diluted alcohol alone.

One argument in opposition to sugar as the preservative agent for fluid extracts remains to be met; it is based on the great difference of the climate of the various sections of the United States, the Northern States usually having severe winters, while the South never experiences such a low state of the thermometer. What is made to keep in a northern latitude, it is argued, may be unstable in the south, prone to change and fermentation. I confess that this ground appears to me to be more untenable than the rest, and the more so as in pharmaceutical practice we have other examples of the same character. I have reference to the consistency of ointments, which even in the North are

often made with an additional proportion of wax, spermaceti or suet, if intended for use during the summer season; while in the South, pharmaceutists are compelled to employ the whole year round a harder preparation as the basis of most ointments and some cerates, than is commonly needed in the North during the corresponding season; and as yet I have heard of nobody who would be willing to find fault with such a procedure, even though the formula laid down in our national Pharmacopœia should not be strictly followed. Substances merely employed as a menstruum without adding to the medicinal qualities of the preparation, may be varied in proportion, so as to impart to the latter that finish which is in accordance with the artistical demands of our profession. I have found that it matters little to the physician whether the base of some ointments be simple cerate, as is often necessary to employ in the South, or simple ointment, which in the North may be the proper menstruum for the same preparation; all that he requires, is the requisite softness or solidity without the addition of some substance imparting additional or injurious properties. The same may be said of fluid extracts. If those which keep well in the North with 12 ounces of sugar in the pint, have a tendency to ferment in the South, no physician could reasonably object to the addition of another ounce or two for the same measure. If of the proper density, and without unnecessary exposure to the intense heat and light of the sun, I am confident they may be made to keep by means of sugar as well in the South as in the North, while to those requiring an addition of alcohol for the complete solution of some ingredients, no further complement of the same will be needed, so that the medicinal qualities of the fluid extract can be kept unaltered in every respect. But to succeed in this, I hold that our pharmaceutical brethren in the South must not rely on experiments made with fluid extracts prepared in the North, but make them for their own use, and I have no doubt as a compensation for the required trouble they will derive high pleasure from the study of the peculiarity of the various processes for the accomplishment of success.

Before conclusion I have to make a remark with regard to a few fluid preparations, which under peculiar circumstances are given to moulding. In full bottles this will be rarely the case,

but when they are opened occasionally and the quantity of atmosphere within is increased and renewed, mould may be produced. To guard against it, or where it has commenced, to check it, I have successfully used sulphuric ether, which in a former paper I have recommended for the destruction of insects. But it is a necessity to keep the ether from mixing with the medicinal liquid, and this may be accomplished by the simple contrivance of fastening or glueing a small piece of sponge to the lower end of the stopper, and dropping a few drops of ether upon it, so that the atmosphere inside the bottles may become charged with its vapors. I have tried it with preparations of stillingia and krameria and found it successful.

Recapitulating the points treated on, I have endeavored to prove the superiority of sugar over alcohol as the preservative agent for fluid extracts for the following reasons :

1. Sugar is a better deoxidizing agent and a better preventive of oxidation than alcohol ;
2. If used in sufficient quantity, it will be a sufficient guard against fermentation ;
3. It does not, like alcohol, add stimulating properties to large doses of fluid extracts ;
4. It will by the aid of a very small proportion of alcohol retain in solution principles, which, after some time, are precipitated from diluted and stronger alcohol alone ;
5. It masks the taste of bitter and nauseous articles better than alcohol ;
6. By the addition of a slight quantity of alcohol, when necessary, the tendency to fermentation and moulding will be effectually counteracted ;
7. The same effect will be produced by the volatile oils which may be obtained from the plants, to be made into fluid extracts, or other oils may be added, that will also serve to improve the taste.

Philadelphia, Feb. 1859.

[The impartial and philosophical manner in which Mr. Maisch has discussed the important subject of which he treats, particularly important at the present juncture as regards the Revision of the Pharmacopœia, should gain for his paper the earnest attention of pharmaceutists, and call forth the results of their experience.—*EDITOR AM. PHARM. JOUR.*]

REMARKS ON PROPYLAMIN.

By WILLIAM PROCTER, JR.

With the progress of discovery since the year 1817, when Sertuerner recognized the alkalinity of morphia, the therapist has been more and more convinced that the organic alkalies have been specially endowed with more well defined and concentrated medicinal power than any other group of organic bodies. These remarkable substances, rendered stable by natural union with acids occurring with them, seem destined in the economy of nature to minister to disease, as in most instances they do not appear to possess any other uses. Since the discovery by Wurtz and others of the important fact, that organic alkalies may be produced artificially in the laboratory, it does not appear that much attention has been directed to the therapeutic power of these derivative bodies; yet in some few instances it has been accorded, and there can hardly be a doubt that a rich harvest awaits the researches of experiment in this direction by the enlightened physician. The number of these alkalies has been largely increased by Hoffman, and Anderson. Several of these, strictly artificial at first, so far as known, have since been discovered in nature, and among them propylamin the subject of this notice.

Having been several times applied to for propylamin by physicians, and this alkaloid not being procurable in commerce, it has been thought advisable to publish a formula for its preparation, and give a notice of its characters more in detail than is found in authorities generally accessible. The origin of the demand for propylamin appears to have arisen from its asserted power in cases of rheumatism, and its variations, by Dr. Awenarius of St. Petersburg, the following notice of whose researches is translated from Bouchardat's *Reperoire de Pharmacie*, Dec., 1858:—"Propylamin, as obtained from the pickle of herrings, codliver oil, ergot, human urine, etc., appears, according to the author, to possess the power of a true specific for the various affections of rheumatic origin. The diagnoses of these diseases being often very obscure, one can succeed (says M. Awenarius) by the use of propylamin in bringing to light in a few days the

true nature of the malady. The author has treated, by means of this remedy, 250 patients in the hospital of Kaulkin at St. Petersburg, between March 1854, and June 1856 ; and besides, it has been employed in outside practice in a considerable number of acute and chronic cases of rheumatism. In acute cases, the pain and fever always disappear the next day. The remedy was prescribed in the following manner, viz.

R. Propylamin	gtt. xxv.
Distilled water,	f. $\frac{2}{3}$ vj. Mix.
and when necessary, add	
Oleo saccharum of peppermint	3ij.

Dose. A tablespoonful every two hours.

It is necessary to carefully ascertain if the medicine is fresh and pure."

Propylamin was discovered by Werthiem in 1850, and may be obtained from various sources. Artificially from narcotina, co-deia, bone oil, and by the action of ammonia on iodized propylene, and naturally, combined with an acid, in herring pickle, the flowers of the white thorn (*Crætagus oxyacantha*), those of the service berry (*Sorbus aucuparia*), *Chenopodium vulvaria*, &c., It is most conveniently prepared from herring pickle or ergot, by distillation with potash. Propylamin is a colorless, transparent liquid, with a strong pungent odor that reminds one of ammonia. As made from some sources it has a fishy odor, whilst from others this character is wanting, and as it is metameric with both trimethylamin and methyl-ethylamin, it is possible that the latter may be mistaken for propylamin. (*Gmelin*.)

Propylamin is soluble in water, has a strong alkaline reaction, forms crystallizable salts, and like ammonia, when a rod dipped in muriatic acid is presented to it, dense vapors of the hydrochlorate become visible by their union. Its composition is C^6H^9N . which is that of ammonia with an equivalent of propyl. Most of the salts of propylamin are soluble in water and alcohol but the sulphate is insoluble in the latter menstruum (*Winckler*). The hydrochlorate is soluble in alcohol, and crystallizes in large tables as obtained from *Chenopodium vulvaria*. All the salts are decomposed with a herring pickle odor by the mixture of potash, and when heated in solution the same fishy odor is perceptible.

Propylamin is prepared by taking any convenient quantity of herring pickle, obtained from the dealers in salt fish; this is put in a retort or tight still with sufficient potash to render the liquid strongly alkaline, and the liquid heated. A well refrigerated receiver, containing some distilled water, being attached, heat is applied as long as the distillate has the odor of herrings. This is then saturated with hydrochloric acid, evaporated carefully to dryness, and the dry crystalline mass exhausted with absolute alcohol, which dissolves the propylamin salt and leaves the muriate of ammonia. From the former, the pure propylamin may be obtained in solution by means of hydrate of lime using strong precautions to refrigerate and condense the vapors which are actively disengaged almost without heating. When made from ergot, Winckler recommends that a solution of the extract of ergot, known as *ergotine*, be distilled with solution of potassa, using the precaution to have some water acidulated with muriatic acid in the receiver which should be well refrigerated. For medical purposes it will be better to employ herring pickle, as the source of propylamin.

NOTE ON CITRATE OF IRON AND STRYCHNIA.

Pittsburgh, February 4, 1859.

PROF. PROCTER:—

Dear Sir,—Soliciting, in the last number of your Journal, the opinion of the medical fraternity, in regard to the new combination of Citrate of Iron and Strychnia, as to what proportion in a therapeutical and medical point would be most desirable, permit me to state, that I have prepared it for some time past, by the request of several of our physicians, in the proportion of

Strychniae cryst.	1 part,
Ferri Citrat.	100 "

As such, it seems to answer better than the former suggested preparation.

The adoption of one uniform formula in all medical compounds, and especially with such powerful agents, is devoutly to

be wished for, in order to avoid serious mistakes and discrepancies, and (above all) to abolish an unprofessional exclusiveness, which is, at the expense of a better mutual feeling even in advanced pharmaceutical bodies still fostered.

Hoping that the communication may assist in agreeing upon a definite formula,

I am yours respectfully,

JOS. ABEL.

ON THE SOLUBILITY OF THE SESQUIOXIDE OF CHROMIUM.

BY CHARLES T. CARNEY.

Editor of Journal of Pharmacy:

Dear Sir,—Allow me to trespass upon your space so far as to state a curious fact in relation to the chrome oxide.

In September 1857, I was led to investigate the Sesquioxide of Chromium, with a view of decomposing the same without injury to any organic matters which might be present with it.

The means usually employed for effecting the decomposition, by boiling sulphuric acid, &c., were of course unavailable, and I was much interested in observing a peculiar reaction which was new to me; and I do not know that it has been before observed.

I found that when the ignited sesquioxide was exposed to the action of the galvanic battery, in presence of a dilute solution of caustic alkali, it was decomposed, the chromate of alkali formed in solution. Thinking it possible that a combination might occur with the caustic alkali and some soluble portion of the chrome oxide, I next subjected some freshly prepared and ignited sesquioxide to the action of caustic alkali for twelve hours; then, after being thoroughly washed and dried, submitted it to the action of the battery.

The result was the same, and from the solution of chromate of alkali obtained, I formed the chromic salts of lead and silver.

Very truly yours,

CHARLES T. CARNEY.

Boston, Feb. 1859.

ON IRON REDUCED BY CARBON.

By M. A. HENRY.

This new preparation, proposed by M. A. Henry, pharmacien at Giromans (Upper Rhine), is an intimate mixture of metallic iron and carbon, obtained by the calcination of an organic salt of iron, the pyrolignite of iron. This salt taken in its liquid state is evaporated to dryness over a gentle fire, and the residue is calcined at a dull red heat. The product is a light, porous, impalpable, nonpyrophoric carbon, of which the composition is uniform where the operation has been properly conducted. The great tenuity and slight density of this carboferric powder renders easy its suspension in liquids, to the bottom of which it does not precipitate like iron reduced by hydrogen. The presence of a notable quantity of charcoal has the advantage of rendering the product more spongy, more absorbent, of facilitating thus the contact of the ferruginous particles with the liquids of the stomach, and of preventing by a special action, analogous to that of the charcoal of Belloc, the eructations of the stomach produced by preparations of iron.

The clinical trials made by Dr. Benoit Cantonal, physician at Giromans, goes to confirm the efficacy of this new product, which M. Henry had rationally foreseen from its chemical composition. The following are the conclusions to which this operator has been led.

Iron reduced by carbon, in the dose of $1\frac{1}{2}$ to 2 grains three times a day, has all the efficacy of the best preparations of iron. Perfectly suspended it has never caused constipation nor dyspeptic exacerbations which so often follow the use of the soluble preparations of iron, and it possesses, nevertheless, an activity much greater than the insoluble preparations, which are frequently resorted to at first. The mean duration of 48 cases of chlorosis was two days and the mean quantity of the medicine administered was 11 grammes 168 grains. The efficacy of this product, its easy preparation, and moderate price, recommends it to practitioners, especially in medicines for the poor.—*Jour. de Pharm. Dec. 1858, from Gaz. Med. de Strasbourg.*

ON VANILLIN THE ODOROUS PRINCIPLE OF VANILLA.

By M. GOBLEY.

The odorous properties of vanilla, and the useful medicinal action which it exercises on the organism as an excitant tonic, gives to the chemical bodies to which it owes these advantages a peculiar interest.

Vanilla is the fruit of a climbing and branching plant which grows in the maritime countries of Mexico, Colombia and Guiana. The plant belongs to the family Orchidææ and was named by Linnæus *Epidendrum Vanilla*, and by Swartz under that of *Vanilla aromatica*.

The chemical researches which have been made in vanilla are already old, by Bucholz and Vogel. The former found in vanilla a fatty oil with disagreeable odor; a soft resin, which when heated smelled weakly of vanilla; a slightly bitter extractive, resembling tannin; sugar; starchy matter and benzoic acid.

In these researches the odorous principle has been entirely neglected. What is its nature? to what class of chemical bodies does it belong? Is it constituted of an essential oil, or by a substance of a different nature? And in either case, what are the composition and properties of the substance? These are questions the author proposed to resolve.

Vanilla, properly divided, was exhausted with alcohol of 85°, evaporated to an extract, this softened with water and agitated in a flask with ether, as long as it cedes any color to the ether. The ethereal liquid is evaporated and treated with boiling water, which dissolves the aromatic principle and gives it in the form of crystals by evaporation in an impure state, which requires treatment with animal charcoal and recrystallization to get it pure.

Thus obtained in a state of purity, this substance is colorless, in the form of long four-sided needles, terminated with two faces. It presents a strong aromatic odor of vanilla, and a hot, biting taste. Its crystals are hard and crack under the teeth, and are neutral to litmus. When heated, it fuses at 195° F., and volatilizes at 302° F. in little needle-shaped crystals of a shining whiteness, and possessing a sweet odor of vanilla.

It is difficultly soluble in cold water; boiling water dissolves it in a large quantity, and deposits it on cooling. It is very soluble in alcohol, ether and the fixed and volatile oils; concentrated sulphuric acid dissolves it and is colored yellow.

It dissolves without alteration in diluted acids. Liquor potassæ also readily dissolves it and yields it unaltered on adding an acid. It does not decompose the alkaline carbonates cold or hot.

Submitted to analysis, it affords a per centage of carbon 75.22; hydrogen 3.98; oxygen 20.20, which lead to the formula $C^{20} H^6 O^4$.

The properties of this substance are analogous to those of coumarin of Tonka bean, which the author, some years since, found in the leaves of *Anagrecum Fragrans*, of the Isle of Mauritius; but their identity is not complete, differing in odor, point of fusion and composition. As it appears to be a distinct proximate principle, the author suggests for it the name *vanillin*.

It is well known that vanilla, enclosed in cases, is often found covered with crystals, known in France under the name "givre," or frost. Bucholz and Vogel considered these crystals to be benzoic acid. The author considers them identical with *vanillin* as it presents the same crystalline form, fusing point and solubility in water, alcohol and ether. The *givre* dissolved in alcohol has a slight action on litmus paper, but Soubeiran, who noticed this, did not hesitate to deny its acid character.

The pre-existence of *vanillin* demonstrates that the crystalline substance, which appears on its surface, is not the product of oxidation of an essential oil, as has been supposed, but is *vanillin*, which is thus transferred to the surface, under favorable circumstances for the evaporation of the juices of the bean.

—*Journ. de Pharm. et de Chimie, Janv., 1859.*

ON THE ACTION OF BICHROMATE OF POTASSA IN DYEING.

By JOHN S. BLOCKEY and HERBERT SUGDEN.

It is well known, that bichromate of potassa is largely used in dyeing certain colors with logwood, the cloth or yarn being boiled in a solution of this salt for a period varying from

twenty minutes to half an hour, previous to its being worked in the dye-bath. It is generally believed, that the action of this substance is of an oxidizing nature; to test the accuracy of this opinion we had recourse to the following experiments:—

1st. A piece of cloth was boiled for twenty minutes in a dilute solution of permanganate of potash—the solution became green, proving the reduction of the permanganate. The cloth was then well washed, and dyed with logwood and chloride of tin (tin spirits) in the usual manner—a color resulted, by no means equal in brilliancy, body or tint to that obtained by using bichromate of potash.

2nd. A fresh piece of cloth was immersed in a cold solution of permanganate, allowing it to stand until the solution became green; but with no better results than in the last experiment.

3d. The same experiment as the last substituting a cold solution of ferrate of potash for the permanganate, with similar results.

4th. The cloth was boiled in a solution of pure chromic acid, previous to being subjected to the dye-bath. The color obtained in this experiment more resembled a bronze than the beautiful blue produced by bichromate of potash. These experiments show that the cloth does not require to be oxidized to prepare it for taking on the dye; indeed, even without the direct evidence of experiment, it seems almost impossible to reconcile the idea of oxidation with bichrome; for, in dyeing with logwood on the large scale, it is well known that the cloth retains the yellow color of that salt and not of the green sesqui-oxide of chromium, which it would do, if the bichromate became reduced by the organic tissue.

A piece of cloth was next boiled in a solution of bichromate of potash, and well scoured, and rinsed, the cloth retaining a slight yellow color, after which it was burnt, and the ashes subjected to chemical tests for the presence of oxide of chromium; formed by the reduction of the chromate by the organic matter at a high temperature. The existence of this compound in the ashes, together with the fact of the cloth being yellow and not green after mordanting with bichrome and scouring, gave abundant proof of the fact that the bichrome itself enters the cloth and remains firmly fixed in the fibre, even after repeated wash-

ings; and showing that it is the entire salt itself, and not the acid of it, which is the acting agent. The question, however, arises, whether the bichromate of potash in the fibre is not acted upon by the acid of the tin spirits in the dye-bath, producing an oxidizing action at the moment when most requisite. This, however, we have found not to be the case by neglecting the mordanting with bichromate of potash, and placing some chromic acid in the dye-bath with the logwood and tin spirits; when, if oxidation be requisite, we expected to have a color equal to that obtained when bichrome is employed; but in this we were disappointed, for the wool could not properly be said to take on any color at all. We are therefore of opinion, that the bichromate forms a definite compound with the haematoxylin of the logwood, in the fibre of the cloth; the more so, as by adding a solution of bichromate of potash to a decoction of logwood, on being boiled, the liquid becomes of an intense black color. It is, therefore, probably owing to a combination of this black matter and the dye from logwood, united to oxide of tin, that the tint of the well-known rich purple logwood blue is due.—*London Chemist, Sept., 1858.*

INVESTIGATION OF STRYCHNINE.

By P. SCHUTZENBERGER.

When a mixture of sulphate of strychnine and nitrite of potash dissolved in water is boiled, a brisk effervescence due to the liberation of nitrogen gas is observed. After the reaction the yellowish liquid treated with ammonia furnishes a light yellow, flocculent precipitate.

The washed precipitate is dissolved in boiling alcohol. On cooling, the liquid deposits transparent, well-defined crystals of considerable size and of a fine orange-yellow color; they appear to be right prisms with a rectangular base, and with truncations at the solid angles. The supernatant alcohol, when concentrated, furnishes a fresh deposit of separate prisms of a darker orange-red color.

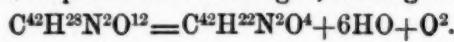
These two bodies form two new alkaloids, and represent two degrees of oxidation of strychnine.

The red base is more oxidized than the orange one. They are both insoluble in water, soluble in alcohol (the red one more than the other), and insoluble in ether. They contain no water of crystallization, are decomposed at about 572° F., fuse on a plate of platinum, and burn with a brilliant flame. Their taste is bitter, but less so than that of strychnine.

The orange base dried at 482° F., loses nothing at a higher temperature, and gave on analysis,—

C	62.5
H	7.06

It also gave 7.05 per cent. of nitrogen, leading to the formula



Theory,—

C	62.37
H	6.93
N	6.93

The chloroplatinate gave 16.10 per cent. of platinum; the formula $\text{C}^{42}\text{H}^{28}\text{N}^2\text{O}^{12}\text{Cl HClPt}$ requires 16.2 per cent. This base may be called *oxystrychnine*.

The red base gave—

		Calculated.
C	59.76	60.00
H	6.85	6.6
N	6.52	6.6

Leading to the formula

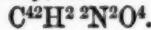


The chloroplatinate gave 15.65 per cent. of platinum; calculated 15.8 per cent. This alkaloid contains 2 equivalents of oxygen more than the preceding, and may be named *binoxystrychnine*.

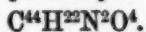
From numerous analyses of strychnine, the author concludes that this body is not constant in its composition. His analyses, and those of Regnault made with octahedric strychnine, agree with the formula



The most common strychnine, from numerous analyses, has the formula adopted, namely,—



Lastly, Gerhardt has published several analyses of chloroplatinate of strychnine, in which the carbon is 1 per cent. too high and the nitrogen 0.5 per cent. too low for the admitted formula, but which agree perfectly with



This is rendered more probable by the fact of the same thing taking place with other bases.—*Chem. Gaz.*, Oct. 15, 1858, from *Comptes Rendus*, July 12, 1858.

MODE OF PREPARING LIQUIDS OF GIVEN SPECIFIC GRAVITY WITHOUT CALCULATION OR PREVIOUS TRIALS.

Densimeter by M. SPACOWSKY.

In the laboratory and in the arts, we are often required to prepare a definite mixture of two liquids, such as sulphuric acid and water, alcohol and water, &c., one of two modes is generally employed. 1st, Given the quantity and specific gravity of one of the liquids, the quantity of the other liquid is calculated. This mode is not always practicable, requires time, and, for alcoholic liquids especially, the concentration or mixture gives rise to difficulties frequently insurmountable; or secondly, areometers are floated in the liquors; but this means, which is very practicable and very much used, presents great difficulties in manufacture, owing to the various temperatures of the mixtures.

A densimeter of a new form constructed by M. Spacowsky, of St. Petersburg, allows the preparation of a liquid mixture with great ease and precision, and without a thermometer.

The apparatus consists of a vessel or areometer of platina. This areometer is closed above by a very thin partition or metallic plate, such as that employed in the arenoid barometers, and yielding to the slightest pressure. At its lower end the areometer is terminated by a tube furnished with a stop-cock. It is suspended by a platina wire from one arm of a delicate balance, and equilibrated by a weight suspended also by a platina wire from the other arm. The equilibrium thus established will evidently be destroyed if the areometer and the counter-balancing weight be plunged in a liquid of the same specific gravity as that which it contains; and as the thin partition allows the

liquid contained to expand in accordance with the temperature to which it may be subjected, a very simple calculation will show that the re-establishment of the equilibrium is independent of the temperature. As, moreover, the metal of which the instrument is made, is very thin and a good conductor of heat, the equilibrium of temperature will soon be established between the interior and exterior liquid.

Now, to reproduce in any quantity, a liquid of given specific gravity; fill the areometer with the given liquid, and plunge it and the equilibrating weight into the heavier of the liquids to be mixed, and add the other until the equilibrium is restored. The liquids will be rigorously of the same specific gravity.—*Journ. Frank. Inst. from Academie des Science de Paris, June 7, 1858.*

ON THE INDUSTRIAL APPLICATION OF BARYTA.

BY F. KUHLMANN:

The author has already called attention to the utility of sulphate of baryta in painting, in distemper and silicious painting, especially as the substitution of this white compound for white lead and zinc white is not only supported by considerations of economy, inalterability, and durability, but also by considerations of hygiene. This double advantage has led the author to persevere in the endeavor to produce sulphate of baryta at a cheap rate on a large scale, and the present paper contains the first portion of his results.

To obtain artificial sulphate of baryta at a moderate price, the first point was to reduce the price of the acids which constitute the principal expense of its manufacture. With this view the author has endeavoured to condense the acid vapors more completely, as a portion of them is lost in the soda manufacturers to the great prejudice of the manufacturers, the public health, and vegetation.

By placing native carbonate of baryta (Witherite) in contact with the vapors escaping from the furnaces for the decomposition of common salt, or from our leaden chambers, after their condensation has been effected under ordinary conditions, the

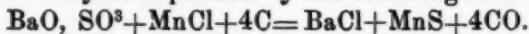
author has succeeded in retaining a great portion of the uncondensed vapours. The baryta dissolved by these acids is converted into sulphate by an addition of sulphuric acid, and the muriatic or nitric acids thus condensed and isolated, are returned into the condensing apparatus of which they increase the profits.

There is a much greater loss of muriatic acid than that caused by the imperfection of condensing apparatus, namely that which necessarily takes place in the manufacture of chlorine or of chloride of lime which constitutes the principal use of muriatic acid. In this manufacture more than half the muriatic acid employed is lost in the form of chloride of manganese. In practice, from the impurity of the oxide of manganese, this loss rises to two-thirds, and becomes of great importance. The author calculates the amount of loss in France alone at two millions of francs (£80,000). Many attempts have been made to turn the residues of the manufacture of Chlorine to some account; the chloride of manganese has been applied to the purification of gas, to the production of ammoniacal salts, to the purpose of disinfection in some systems of sewerage; and lastly, some attempts have lately been made, in the great manufactory of Mr. Tennant near Glasgow, to regenerate the oxide of manganese, and render it capable of again producing chlorine, but all these applications are insignificant compared with the great quantity of residue produced.

The liquid residues of the manufacture of chlorine have also generally formed serious embarrassments in chemical factories, and have even been productive of danger to the public health, whether they were allowed to flow into streams of water, or caused to penetrate into the soil by means of absorbing wells.

After the condensation of the acids lost in the atmosphere, the author turned his attention to the utilization of those contained in the liquid residues; and he has succeeded in effecting this completely, by availing himself of a reaction analogous to that which permitted Leblanc to endow France with the manufacture of artificial soda. In Leblanc's process a mixture of suitable proportions of sulphate of soda, chalk, and charcoal, is converted under the influence of a high temperature into insoluble oxysulphuret of calcium and carbonate of soda, which is easily isolated in consequence of its solubility.

In the author's process a mixture of suitable proportions of native sulphate of baryta, chloride of manganese and charcoal, is converted in the same way into insoluble sulphuret of manganese and chloride of barium, which is easily separated by lixiviation. The reaction may be expressed by the following formula :—



An analogous reaction may likewise be established for the chloride of iron which always accompanies the chloride of manganese. The charcoal always acts as a deoxidizing agent, and becomes converted into oxide of carbon.

After some trials to ascertain a good proportion, the author arrived at a result which exceeded his hopes, allowing the native sulphate to be converted into chloride of barium, without a greater loss than 3 or 4 per cent. of the sulphate employed.

The mode of operation is as follows :—The transformation above mentioned is effected in large reverberatory furnaces of the same construction as the soda-furnaces, or, what is better, the furnaces for the decomposition of common salt, in which the bed is divided into two compartments by a low ridge. When these furnaces have been heated for some time, a finely powdered mixture of native sulphate of baryta and coke is introduced into the compartment furthest from the fire ; over this is poured the crude residue of the manufacture of chlorine, after its excess of acid has been saturated with a little chalk or native carbonate of baryta. The action of the heat upon this mass thickens it by degrees. When brought to the condition of a firm paste, it is pushed by means of suitable iron instruments, over the separating ridge, into the compartment nearest to the fire. Here the mass swells up, and soon emits small flames of oxide of carbon, like those which are observed at a certain period in the soda furnaces, but which derive a slight greenish color from the baryta. After an hour of calcination at a red heat, a semifluid paste of rather more consistency than crude soda, is turned out ; on cooling, this furnishes a black mass, formed of chloride of barium a little hyposulphite of baryta, and sulphurets of manganese and iron. After exposure to the air for a few days this crude chloride of barium becomes disaggregated ; the hyposulphite contained in it passes to the state of sulphate. The lixiviation is then effected by the aid of heat in the apparatus usually employed in the lixiviation of soda.

The product of this lixiviation consists of a perfectly clear solution of nearly pure chloride of barium. If there be a slight excess of sulphuret of barium, giving it a yellowish color, this is removed by the addition, until complete decolorization, of a solution of chloride of manganese, the residue of the manufacture of chlorine, from which all the chloride of iron has been separated by a previous digestion with native carbonate of baryta. If, on the contrary, there is a slight excess of the salt of manganese, it is got rid of by a little sulphuret of barium.

A circumstance of some interest, especially in a scientific point of view, is that in clearing out a furnace, the author found that in the part of this furnace where the sulphate of baryta was nearest to the grate, and where at the same time it was in contact with the brick, there was an abundant deposit of a green and blue matter, containing no soda, manganese or cobalt, and which appeared to be an ultramarine in which baryta replaced the soda. The author calls attention to the fact, that before the *Societe d'Encouragement* proposed a prize for the discovery of a means of manufacturing artificial ultramarine, M. Tassart had indicated the production, in a soda furnace, of a blue matter which M. Vauquelin recognized as ultramarine, and that soon after this first observation he noticed the production of the same artificial ultramarine, under circumstances which rendered the explanation of the phenomena of its formation less difficult, in a portion of the furnaces for the calcination of sulphate of soda, where this sulphate was in contact with the bricks at a high temperature.

The first observation of the existence of a barytic ultramarine, under analogous circumstances, would furnish another proof that the germ of a discovery may lie in an attentive examination of some fragments of a furnace in course of demolition.

Manufacture of various acids.

In his previous memoir the author indicated the uses to which he has put the chloride of barium which constitutes the base of his operations. He stated particularly that by mixing a concentrated hot solution of chloride of barium with a solution of caustic soda, hydrated baryta was obtained, and that anhydrous baryta might be economically procured by the calculation of nitrate of baryta prepared from the chloride. The nitrate decomposed by sulphuric acid served for the manufacture of nitric acid without distillation, and of artificial sulphate of baryta,

and chloride of barium treated in the same way furnishes this sulphate and muriatic acid.

The nitric acid furnished by the new process marks 10° B., and may be employed directly in the preparation of certain nitrates; the muriatic acid, although its density does not exceed 6° B., may find numerous applications, besides its employment in the production of certain chlorides; it may be used in the acidification of bones, in washing animal charcoal, in the composition of acid bleaching baths, &c.

With the view of ascertaining the limits within which the concentration of these acids should be restrained in order to avoid loss by vaporization, the author made a series of experiments, from which it appears—1st, that the dilute nitric acid cannot be directly concentrated beyond 20° or 25° B.; and 2ndly, that the direct concentration of the muriatic acid cannot exceed 14° B., and that it is better to stop below this limit. The maximum fixity of hydrochloric gas in solution is at a density of 14° B.; its boiling-point is then 228° F.

Manufacture of tartaric acid.

Tartaric acid is prepared from bitartrate of potash by saturating the excess of acid of that salt with native carbonate of baryta, and decomposing the neutral tartrate by means of chloride of barium. The ebullition of a solution of bitartrate of potash with native carbonate of baryta produces a liquid which is perfectly neutral, and may even be slightly alkaline.

The tartrate of baryta thus obtained is well washed with cold water, heated, and decomposed with dilute sulphuric acid, in sufficient quantity to remove the whole of the baryta of the tartrate. The solution furnishes tartaric acid, the whole of which crystallizes readily; the deposit of very heavy sulphate of baryta is washed by decantation, and the washing-waters may be used to dilute the sulphuric acid intended for new operations. This substitution of baryta for lime in the manufacture of tartaric acid has the advantages that the base employed is used in the form of artificial sulphate of baryta, and this sulphate separates from the tartaric acid with greater rapidity than sulphate of lime, which is very bulky, and is moreover very soluble in acid liquids.

Sulphuret of barium may be substituted for the native carbonate and the chloride; but the tartrate of baryta produced by this reaction has a gelatinous appearance and is washed with difficulty; whilst with the carbonate and chloride the tartrate is granulated and its washing is very easy. The only advantage that would be presented by the employment of the sulphuret would be its furnishing sulphuret, instead of chloride of potassium, the former being the more valuable.

Manufacture of citric acid.

The same process is applicable to this purpose, with the same advantages. Lemon juice, concentrated or not, is converted into citrate of baryta by means of pulverized native carbonate, with the assistance of heat; the saturation being completed by means of a little sulphuret of barium, baryta precipitated by caustic soda, chloride of barium mixed with ammonia, or even by ammonia alone. These bodies precipitate the citrate retained in solution by an excess of citric acid. The citrate obtained may be purified by washing with cold water. Its decomposition must be effected with the aid of heat, by 1 equiv. of sulphuric acid of spec. grav. 1.834, diluted with 5 or 6 parts of water. To ascertain the quantity of sulphuric acid necessary for the decomposition of the citrate of baryta (and also of the other barytic salts here mentioned), a known quantity should be incinerated with the addition of a little pure nitrate of potash, and the amount of baryta determined.

The citric acid thus isolated, crystallizes with much greater facility than when citrate of lime is decomposed by sulphuric acid; in the latter case the citric acid retains some sulphate of lime.

Manufacture of acetic acid.

When crude pyroligneous acid is saturated with native carbonate of baryta or sulphuret of barium, it furnishes an acetate which should be calcined at a moderate temperature, to avoid decomposing it, but sufficiently to cause its solution to deposit the tarry matter. In all cases it is necessary in this calcination to keep below a red heat. This operation may, if necessary, be repeated several times.

The acetate of baryta thus obtained is decomposed by 1 equiv. of sulphuric acid ; the decomposition is only complete when the solution of the acetate is not too much concentrated. The result is artificial sulphate of baryta and weak acetic acid, which, however, is strong enough to be applied in various ways in the arts. Thus it may be employed directly in the manufacture of white lead, acetate of lead, and other acetates.

When the solution of acetate of baryta is too concentrated, the sulphate of baryta does not separate in the ordinary form ; it then retains some acetic acid, and presents a gelatinous, semitransparent appearance, which is not got rid of without difficulty.

To obtain a purer acid the acetate of baryta may be converted into acetate of soda, by the addition of sulphate of soda. In this way the formation of the double sulphate of soda and lime, which usually occurs in the ordinary process with lime, is avoided.

Chromic acid, hydroferrocyanic acid, &c.

Dğbereiner had employed baryta in the preparation of chromic acid, and Porret in that of hydroferrocyanic acid.

I. The usual process employed in the laboratory for the isolation of chromic acid, consists in the action of an excess of sulphuric acid upon chromate of potash. To prepare this acid for use in the arts, the author employs chloride of barium and neutral chromate of potash, the double decomposition of which furnishes chloride of potassium and chromate of baryta. The latter is treated with 1 equiv. of sulphuric acid, diluted with ten times its volume of water, and the action is aided by heat ; the insoluble sulphate of baryta is rapidly deposited and the solution of chromic acid marks 10° B. The chromic acid may be concentrated to 50° or 60° B., by evaporation in earthenware vessels, or even in leaden cauldrons. The sulphate of baryta, even when washed, retains some chromic acid ; it may be used in the preparation of colors.

Chromate of baryta may be substituted for chromate of lead in painting ; it is of a bright yellow color, but less intense than that of chromate of lead. Its economy and inalterability give it a preference over the lead-salt.

II. Ferrocyanide of barium, obtained by decomposing a hot solution of ferrocyanide of potassium by chloride of barium, is very sparingly soluble; it is precipitated at the moment when the solutions are mixed, in the form of small yellow crystals. In this state it still retains some potassium, from which it may be freed by boiling with a solution of chloride of barium.

By mixing together in the cold equivalent proportions of the ferrocyanide thus purified and dilute sulphuric acid, the decomposition takes place instantaneously; sulphate of baryta is thrown down, and the liquid, which acquires a green color, contains the hydroferrocyanic acid. By using sulphuric acid of spec. grav. 1.834, diluted with 5 or 6 times its volume of water, the acid isolated presents a density of 12° to 15° B.

This acid cannot be concentrated by heat; to obtain it directly in a state of greater concentration, less water may be employed in its preparation, but then the sulphate of baryta would be washed with more difficulty. The acid should be preserved in well-stoppered earthen vessels.

With the acid thus isolated the author obtains hydroferrocyanic acid in a solid state and perfectly pure, by adding an excess of concentrated muriatic acid and a little ether, and drying the product without heat in presence of fragments of quicklime. In this way he avoids the presence of the chloride of potassium which remains mixed with the acid, when ferrocyanide of potassium is treated by the same agents.

This process is also applicable to all the acids which are now isolated by the decomposition of their lead-compounds by sulphuretted hydrogen, or their lime-compounds by sulphuric acid, such as malic acid, phosphoric acid, &c.—*London Chem. Gaz.* Nov. 1, 1858, and Dec. 15, 1858, from *Comptes Rendus*.

ON SYRUP OF IPECACUANHA.

BY ISRAEL J. GRAHAM.

It has always been an object with the writer in the preparation of this syrup, to conduct the process with a view to avoid any possible injury which might arise, during the prolonged

application of heat requisite to concentrate the solution to the proper degree, when made in accordance with the officinal directions of either the present or preceding Pharmacopœia; acting under the belief that in this as well as many other medicinal preparations of organic substances, heat exerts an influence more or less injurious either by its direct effect upon the active principle of the plant itself,—even though this may not be viewed as of a volatile nature—or through the medium of some volatile constituent with which this may be in combination, whereby the result is so modified as frequently to be rendered much less efficient than was contemplated by the formula, or than the same amount of material which it represents, would be in substance.

Sometimes the inefficiency of a preparation may be due to the carelessness or ignorance, or both combined, in the manipulator; at other times the formula itself may be defective. The effect of it all is to bring discredit upon remedies which in themselves would be valuable—were all the necessary precautions observed in their manufacture.

The term "water-bath" as generally understood, and which is so frequently directed by the pharmacopœia as the means of evaporating liquids, is not sufficiently definite to guard against damage in all cases when the aid of heat is required in the fulfilment of specified objects, and the opinion is fast gaining in the writer's mind that, when a formula gives any directions which require the application of heat, the temperature which is proper to be employed, should be distinctly stated and regulated accordingly by a thermometer. This, it is believed, would cut off one great source of error pertaining to the preparation of organic remedies.

These remarks are somewhat digressory, but the importance of the subject seemed to demand them, and to return to the special object of this paper, which is to offer what the writer conceives to be an improved formula for the syrup of Ipecacuanha, he would state that his first modification of the formula was in reference to the Pharmacopœia of 1840, by which process he has continued to prepare the syrup until quite recently. It consisted in exhausting the powdered root by the process of percolation, with a menstruum composed of two parts of alcohol

and one part of water, using only about one half the quantity of menstruum to effect the exhaustion, as that prescribed by the formula. The liquid was then heated to about 150° or 160° Fahr. by means of a water-bath, and when cold, filtered; the residue on the filter being well washed with the same menstruum, the resulting solution was reduced to about one-third of the original quantity by means of a water-bath maintained at a temperature of about 150° Fahr. The concentrated liquid thus obtained, containing a portion of alcohol was mixed in due proportion with simple syrup.

The preparation as thus made was an efficient one, and kept well during warm weather.

The large quantity of inert matter taken up by diluted alcohol, from Ipecacuanha, and afterwards precipitated from the solution on standing, which is greatly increased in bulk by heating the liquid, together with the circumstance of it containing some alcohol, continued to be an obstacle to the full adoption of the formula even when thus modified. This precipitated matter not only impeded filtration but rendered its complete washing very inconvenient, while at the same time the clear liquid retained principles favorable to fermentation.

These circumstances induced the writer to seek a menstruum which would extract the active portions of the root only. Among the constituents of Ipecacuanha may be named Emetia, its active principle; fatty matter, wax, gum, starch, &c. Emetia is procured by treating an alcoholic extract of the root with water, decomposing the aqueous solution with magnesia, &c. It was evident therefore to the writer's mind, that alcohol was the proper solvent to use in the preparation of the syrup.

A syrup prepared by first treating the root with alcohol, the writer afterward discovered was proposed in a formula published by Jos. Laidley in the 26th vol. of the American Journal of Pharmacy, page 103; this process requires too large a proportion of menstruum, too much evaporation and consequently a too long application of heat, resulting in a turbid syrup which requires to be clarified by the addition of the white of egg and boiled, rendering the process too complex and otherwise objectionable.

The process which the writer has adopted, and found to completely fulfil every object in view, is the following:

Take of Ipecacuanha in powder (prepared by passing through a sieve of 60 meshes to the linear inch) two ounces: Prepare a menstruum of one part of water and seven parts of 95 per cent. alcohol; add sufficient of this to dampen the powder uniformly, (about six fluidrachms) pack it tightly in a funnel displacer* and having laid over the surface a piece of perforated paper, pour on eight fluid ounces, or less, of the above menstruum, covering the top of the funnel with oiled silk to prevent evaporation. When two and a half fluid ounces of liquid pass, remove it and submit to spontaneous evaporation until reduced to one and a half fluid ounces: continue the percolation until five and a half fluid ounces more pass, evaporate this by means of placing the dish over hot water, contained in a suitable vessel and removed from the fire, until reduced to half a fluid ounce; mix this with the fluid ounce and a half first obtained and filter.

The result is a fluid extract of which, it is believed, one fluid ounce fully represents one ounce of the root, and which may be prepared in any convenient quantity. The portion of liquid submitted to spontaneous evaporation, contains nearly all the active principle of the above quantity of root; the percolation is continued to insure its complete exhaustion, and in evaporating this latter product the object is to prevent the temperature rising higher than 140° Fahr.

To convert this quantity of fluid extract into syrup of the officinal strength, pour it upon eight ounces of white sugar in powder, contained in a large mortar or dish and expose it until all the alcohol has evaporated, and a perfectly dry powder results; dissolve this in a quart of water, and after standing awhile with occasional agitation, strain it through a muslin cloth to separate a little resinous or waxy matter which will be found floating, remove this and treat it with two fluidrachms of water in a mortar, then mix it with the strained liquid and filter all through paper; add sufficient powdered sugar to make the whole

* An ordinary glass funnel with a loose plug of cotton in the upper part of the neck.

measure four pints, agitate occasionally until dissolved, and strain if necessary.

It would be better in the writer's opinion, if the strength of this syrup was increased to one ounce of the root to the pint, instead of half an ounce as at present.

The syrup prepared by this mode presents a lighter color than when made in the usual way, is perfectly clear and bright, entirely free from alcohol, and although possessing the peculiar odor of the root, is very pleasant to the taste, and it is believed will keep as well as simple syrup.—*Journal and Trans. of the Maryland Col. of Phar.*, Dec. 1858.

ON FERRATED TINCTURE OF BARK.

BY WILLIAM S. THOMPSON.

In the American Journal of Pharmacy, third series, vol. 1st, p. 402, Mr. Samuel Simes of Philadelphia gives a formula for this preparation, in which the tannic acid is removed from the compound tincture of cinchona, by digesting it with hydrated peroxide of iron, dried at a temperature not exceeding 130° Fahrenheit; which is then filtered and 16 grains of Ammonio citrate of iron, is dissolved in each fluid ounce of the filtrate.

Not having succeeded in making a perfectly satisfactory preparation, according to the formula of Mr. Simes, I have been led to devise a plan, by which ammonio citrate of iron can be dissolved in the compound tincture without disturbing the chemical relations of the tannic acid and the alkaloids, as they exist naturally in the bark.

Availing myself of the fact, that a protosalt of iron is not precipitated by tannic acid, either in a free or combined state, I first prepare protocitrate of iron, which is converted into the ammonio citrate, protected by the addition of sugar, evaporated to about the consistence of syrup, and then poured into compound tincture of bark, made a little stronger than by the officinal direction. The resulting preparation is a clear tincture of dark brown color, possessing all the aromatic properties of the compound tincture, with but little chalybeate taste.

The following is the formula I propose: first take the dry

ingredients, for twenty fluid ounces of the compound tincture, according to the Edinburg formula; having properly bruised them, displace with diluted alcohol eighteen fluid ounces of tincture. Next prepare the ammonio citrate of iron as follows:

Take of Protosulphate of iron crystallized,	379 grains.
Carbonate of soda,	394 "
Liquor ammoniæ,	284 minims.
Citric acid,	189 grains.
Refined sugar,	2 ounces.
Water; a sufficient quantity,	- -
Simple Syrup; a sufficient quantity.	

Dissolve the protosulphate of iron and carbonate of soda, each separately in four fluid ounces of water and mix the solutions adding about half an ounce of simple syrup. When the precipitate has subsided pour off the supernatant liquid and wash thoroughly with water containing about a fluid ounce of simple syrup in each pint; allow it to settle for about twelve hours and decant. Transfer the precipitate to an evaporating dish, add the citric acid, and when the solution is complete, the liquor ammoniæ, then the sugar. Evaporate the mixture to two fluid ounces, and add it to the eighteen fluid ounces of tincture.—*Journal and Trans. of the Maryland Col. of Phar.*

NEW TEST FOR THE PURITY OF CHLOROFORM.

(Translated by PROF. L. H. STEINER, from the French of M. ROUSSIN, for the Journal.)

A new class of salts called *double nitro sulphides of iron* has just been discovered, and nearly all the representatives of the class possess the very singular property of being absolutely insoluble in pure chloroform, although soluble in water, alcohol, ether or wood-spirit. When chloroform contains either alcohol, ether or wood-spirit, the nitro-sulphide is dissolved and their presence is detected by a deep coloration of the liquid. In fact all the nitro-sulphides possess great coloring properties; 5 centigrammes will give 2 litres of alcohol the color of ordinary brandy. Pure chloroform when only hydrated will not be dis-

colored by these salts. The sensitiveness of the reagent is so great that a thousandth of alcohol, wood-spirit or ether, in the chloroform, can be readily detected. Roussin has experimented with different specimens of the chloroform of commerce and found a percentage of alcohol in some truly fabulous; and in others, which gave but a very slight opalescence after being agitated with water, the nitro-sulphides produced a color almost black.

The test is easily applied, by introducing the chloroform into a tube closed at one end, then adding a few centigrammes of the nitro-sulphides and shaking the contents of the tube. It is allowed then to rest for a few minutes. The chloroform if pure will remain as limpid as distilled water: but if it contain alcohol, ether or wood-spirit, it assumes a dark color, varying with the percentage of these foreign substances, but which is appreciable even when as small an amount as a thousandth is present.

To prepare the nitro-sulphide of iron, it is only necessary to mix two solutions,—one of nitrate of potassa and the other of sulphhydrate of ammonia, and adding, drop by drop, to this mixture a solution of proto sulphate of iron, constant stirring being employed, until the mixture retains but a slight alkaline reaction. It is then raised to the boiling point, and is evaporated to dryness over a water bath. The residuum is treated with alcoholized ether and thrown on a filter. By evaporation of this liquid, prismatic crystals of the binitrosulphide of iron are obtained which should be washed with weak liquor ammoniæ. The product is then dried in the air on some folds of absorbent paper, and preserved in a flask with a ground stopper.

This body may be considered as a compound of sulphide of iron, sulphydric acid and binoxide of nitrogen. Its formula is $-FeS, NO_2 + Fe_2S_3, NO_2 + HS$. It resembles the double cyanides of iron by its chemical behavior, and the latent state of the molecules of iron, the nitropiussiates by the similarity in formation, and a grouping so analogous that it is possible to pass from one series to the other by a simple substitution.—*Journal and Trans. of the Maryland Col. of Phar.*

CHEMICAL MATCHES WITHOUT PHOSPHORUS OR OTHER POISON.

By M. CANOUIL.

The new matches are absolutely without white or red phosphorus, ordinary or amorphous. They cannot be used as a poison, and when reduced to their least degree of inflammability give rise to no danger of fire. They are formed essentially of chlorate of potash, mixed with a small quantity of a metallic peroxide, bichromate or oxysulphuret, when it is desired to render them more inflammable. The author has found means to triturate the chlorate of potash, even when dry, without danger of explosion.

The new matches diffuse no odour, either in the manufacture or in use; they light without explosion or projection.—*Chem. Gaz., from Comptes Rendus*, June 28, 1858.

ON CRYSTALLIZED VALERIANATE OF ATROPINE.

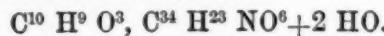
By H. CALLMANN.

This salt forms perfectly white and light crusts; the crystals appear to belong to the rhomboidal system, and the faces are very brilliant. At a temperature of 68° F. the crystals soften, and at 89°.6 F. they are liquefied. Under the double influence of air and light, they soon acquire a yellow color. The carbonic acid of the air displaces a certain quantity of valerianic acid, which is recognizable by its peculiar odor.

The crystallized salt presents the various reactions of the salts of atropine and of the valerianates. It is extremely soluble in water, less so in alcohol, and still less in ether. The analysis of the salt, dried *in vacuo* at the ordinary temperature, gave :—

C	66.40	66.20	66.00
H	8.90	8.81	8.50
O	24.70	24.99	25.50
N			

These numbers lead to the formula



Chem. Gaz. Jan. 1, 1859, from Comptes Rendus, Sept. 6, 1858.

ON THE CONVERSION OF THE NITROGEN OF NITROGENOUS MATTERS INTO NITRATE OF POTASH.

By MM. CLOEZ and GUINET.

The conversion is effected by means of permanganate of potash. The permanganate employed was ascertained to contain no nitrate. Several grammes of crystallized permanganate were converted by sulphurous acid into a mixture of sulphates of manganese and potash, which contained no trace of nitrate.

As has already been stated, ammonia in excess reduces permanganate of potash in the cold, and forms nitrate of potash. But if an excess of permanganate be added and the whole boiled, the nitrate itself is converted into nitrate of potash. In this, as in all the following experiments, the authors have produced at least 1 gramme of crystallized nitre.

Aniline immediately reduces permanganate of potash with a great evolution of heat. Carbonate and oxalate of potash are produced, but only traces of nitrate.

With quinine, the reaction commences in the cold, but is only completed by boiling. It furnishes carbonate and nitrate of potash, and the potash salt of an acid which appears to be new.

Cinchonine is acted upon with more difficulty than quinine.

Cyanogen immediately reduces permanganate of potash in the cold. This is also the case with hydrocyanic acid and cyanide of potassium. In these three cases, nitrate of potash was readily obtained.

The authors think that the action of permanganate of potash upon cyanogen may be employed in the analysis of gaseous mixtures, for example, to separate cyanogen and carbonic acid which has no action on the permanganate, and this is also the case with oxide of carbon, protoxide of nitrogen, &c. Deutoxide of nitrogen, on the contrary, is absorbed in the cold and forms nitrate of potash.

Compounds containing sulphur and cyanogen furnish sulphate and nitrate of potash. This is the case with the body called *sulpho-cyanogen* by some chemists, which is obtained by the action of chlorine upon sulphocyanide of potassium.

Nitroprussiate of soda is also oxidized very easily, with formation of nitrate of potash. Ferrocyanide of potassium mere-

ly passes to the state of ferridcyanide, which resists the action of the permanganate.

Urea is oxidized with great difficulty; after boiling for a whole day, it only furnishes small quantities of nitrate.

Gelatine is readily acted upon in the cold, forming carbonate and nitrate of potash, besides a peculiar salt of potash, which acquires a bright red color when heated to 392° — 572° F.

Pyroxylene is acted upon when boiled, as are also nitronaphthaline and nitrobenzine. In these three cases a considerable quantity of crystallized nitrate of potash was obtained.

Nitronaphthaline also furnished a salt presenting the characters of phthalate of potash, the product which is obtained when naphthaline is oxidized by permanganate of potash.

Nitrobenzine furnished a salt crystallizing in large rhomboidal laminæ, containing an acid which is but sparingly soluble in cold water.

Of course the oxidation of the nitrated derivatives may furnish products different from those obtained by the oxidation of the bodies forming these derivatives. The oxidation of the nitrated derivatives may even be more easy than that of the original substances.

In general it is difficult to foresee whether a given body will reduce permanganate of potash with more or less difficulty. Thus oxide of chrome, precipitated, washed, and dried at the ordinary temperature, reduces the permanganate in the cold, forming chromate of potash and oxide of manganese. By ebullition the reduction is complete in a few minutes, which it would have been impossible to predict from the known properties of hydrated oxide of chrome.—*Ibid, from Comptes Rendus, Nov. 2, 1858.*

ON RUMICINE.

By KARL VON THANN.

The object of this investigation was to show the identity of rumicine with the chrysophanic acid discovered by Rochleider and Held in *Parmelia parietina*.

Rumicine was first prepared in 1831 by Buchner and Herber-

ger, in an extremely impure state, and described by them under the name of lapathine ; they extracted the roots of *Rumex obtusifolius*, first with ether and afterwards with alcohol, and separated the lapathine from the latter extract ; this contains so small a quantity of rumicine that they did not even recognize its extremely sensitive reaction with alkalies.

In the year 1834 Geiger prepared the substance, to which he gave the name of rumicine, in a pure state from the root of *Rumex patientia*. He prepared an alcoholic extract of the root, and this, when diluted with water, threw down an insoluble body. The ethereal extract of this body furnished a brownish-yellow residue when evaporated, and this, by repeated washing with alcohol and finally with ether, was converted into a deep yellow powder with a greenish tinge (resin).

From dry and peeled roots Geiger obtained a far finer rumicine, which, as he remarks, " was undistinguishable by the eye from the rhabarbarine previously obtained without nitric acid, &c., (from the root of rhubarb) ; it also behaved chemically exactly like that body." Afterwards he purified the rumicine by digestion with nitric acid and hydrated oxide of lead in solution in ether ; the rumicine thus obtained was, as Geiger says, of a beautiful bright yellow color, with many crystalline particles.

Geiger also obtained rumicine from *Rumex obtusifolius*, and remarks that this plant contains very little of it. Geiger is therefore the true discoverer of rumicine, and on first preparing it called attention to its near relation and probable identity with rhabarbarine.

In 1841 Riegel investigated the root of *Rumex obtusifolius*, and obtained rumicine from it in a tolerably pure state, by various methods, including those of Geiger and Vaudin (the latter recommended his method for the preparation of rheine). At last he prepared rumicine from the ethereal extract of the root, as recommended by Brandes for the preparation of the yellow matter of rhubarb. He distilled off the ethereal extract, filtered the granular crystalline yellowish-brown mass deposited in the residue, and then recrystallized it several times from alcohol.

The latter method was also followed by the author essentially in the preparation of the rumicine which served for his analy-

ses; but he adopted another mode of purification, because by Riegel's method he only obtained the substance in a very impure state.

The coarsely pounded roots of *Rumex obtusifolius* (*Radix lapathi acuti* of the shops) were extracted by anhydrous ether in a displacement apparatus, and the combined extract distilled on the water-bath, until only a small residue was left. On cooling, a dark brown mass separated from this, which was filtered, washed with a little ether, and then dried between several folds of filtering-paper. When dried, it was boiled with alcohol of spec. grav. 0.833 and filtered; a dark brown body remained on the filter, whilst, on the cooling of the hot filtrate, a dingy greenish-yellow mass separated therefrom, which remained greenish after repeated solution in alcohol and separation, and only exhibited traces of crystallization. As the green resin could not be separated in this way, the alcoholic solution of the substance was precipitated by a large quantity of water; the flocculent, yellow precipitate was separated by filtration, and, after drying, dissolved again in alcohol of spec. grav. 0.833, when a small quantity of a brown body remained undissolved. This operation was twice repeated, but the substance still continued impure.

The final purification was effected by the author in accordance with the process of Rochleider and Held, employed by them in their investigation of the lichens.

For this purpose the substance was treated with a mixture of ammonia and weak alcohol, the filtered solution diluted with water, and neutralized by acetic acid; the yellow precipitate was completely washed with water, and the same operation was repeated; the last precipitate obtained was dried and recrystallized from alcohol; the crystalline mass deposited was again dissolved in ether, and the solution left standing in a loosely covered vessel, in which the rumicine slowly crystallized as the ether evaporated.

The rumicine thus obtained formed a shining crystalline mass of a light golden-brown color, which was seen under the microscope to consist of distinct, yellow, transparent prisms, apparently belonging to the monoclinohedric system, and exhibit a golden-yellow color by reflected light. By crystallization from

hot alcohol on its cooling, the author obtained rumicine (unfortunately in very small quantity) in the form of a pure yellow, crystalline mass, with a golden lustre. The previously mentioned light-golden-brown, crystalline mass was analysed, and gave results agreeing with the formula proposed by Gerhardt for chrysophanic acid, $C^{23} H^{10} O^8$.

C	69.59	69.64	28=168	69.42
H	4.36	4.59	10 10	4.13
O	8 64	26.45

This substance was evidently still contaminated with a small quantity of a body containing more carbon or less oxygen, which was also indicated by its darker color.

That rumicine does not merely possess a similar per centage composition with chrysophanic acid, but that it is also identical therewith, is shown by its behaviour towards reagents.

Rumicine dissolves with extraordinary difficulty in cold water; it dissolves more readily in ether, and still more in strong alcohol. When heated upon platinum-foil, it fuses and emits fumes of an intense yellow color, whilst a portion remains in the form of a vesicular coal, which, when more strongly heated, burns away without residue; if the same experiment be made in a test tube, the colder portion of the latter becomes coated with a yellow deposit, which appears crystalline and of a golden lustre under the microscope. It concentrated sulphuric acid, it dissolves with an intense red color; and, when the solution is diluted, is thrown down again in yellow, voluminous flakes. In alkalies, it dissolves very readily, with a splendid dark-red color (in potash much more easier than in ammonia): it is precipitated without alteration from these solutions by acids. The solution in potash becomes violet-blue, and darker by evaporation. Potash is the best for rumicine. The ammoniacal solution gives a lilac precipitate with neutral acetate of lead, and a beautiful rose-colored one with alum.

The alcoholic solution of rumicine gives a reddish-white precipitate with an alcoholic solution of basic acetate of lead (but none at all with the neutral acetate), which is converted into a rose-colored precipitate by boiling with water. With acetate of copper in alcohol, it gives a blackish-green precipitate, which

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when diluted and carefully mixed with a few drops of ammonia is converted into a voluminous deep blue precipitate (very different from hydrated oxide of copper), and is soluble with a violet-blue color in an excess of ammonia.

The reactions of chrysophanic acid agree perfectly with the above.

Besides the method above described, the author also attempted to prepare rumicine by the method recommended some years ago by Rochleider for the preparation of chrysophanic acid; but the solution of potash in aqueous alcohol extracts from the root, together with the very small quantity of rumicine, so many other substances, that the subsequent purification is attended with as much difficulty as in extraction by ether.

There is consequently no doubt that rumicine (also called lapathine) is identical with chrysophanic acid; and the author concludes his memoir with an expression of his conviction that he has wiped away two out of the chaos of names of imperfectly investigated organic compounds.—*Chem. Gazette, Jan., 1859, from Sitzungsber. der Wiss. zu Wien, xxxi. p. 26.*

PRESERVATION OF ANIMAL AND VEGETABLE SUBSTANCES.

A patent has lately been taken out for effecting this object. The improvements consist in coating animal and vegetable substances with a compound formed of vegetable albumen and a suitable antiseptic material. The coating is effected by immersing the substances to be preserved in the prepared compound two or three times, each coating being dried or set in a current of air before the next is applied. The object of combining an antiseptic agent with the vegetable albumen is to prevent a partial decomposition of the substances before the protective coating is properly hardened. The following means may be adopted for carrying the invention into effect:—supposing a joint of meat to be the substance to be preserved, the meat (with as much of its blood extracted as possible) is first washed or immersed in water impregnated with acetate of alumina, and allowed to drain; it is then suspended by a string, and allowed to descend into a bath composed by placing about one pound of gum tragacanth in from one and a-half to two gallons of heated

water for about twenty-four hours, straining the solution, then mixing with it a warm solution of about six ounces of gelatin or paste, and finally adding about ten ounces of acetate of alumina, mixing and straining. The meat is kept in this bath for about two minutes, being drawn and moved about in it by the string ; it is then taken out and suspended in a current of dry air for about twenty-four hours. The process of immersion, &c., is repeated once or twice, as may be considered desirable.—*Chemist, Nov. 1858, from the Journal of the Society of Arts.*

ON UREA AS A DIRECT SOURCE OF NITROGEN TO PLANTS.

BY CHARLES A. CAMERON, M. D.

At the meeting of the British Association, held at Dublin last year, I read a paper, in which I proved the inutility of fermenting liquid manure before applying it to the purpose of fertilizing the soil, and demonstrated that urea, without being converted into carbonate of ammonia, may be taken up into the organism of plants to be used as nitrogenous food. The experiments detailed in this paper have not been published *in extenso* in the Report of the British Association ; I therefore give them here, as well as the results of some other experiments of a practical character, which have since been performed under my direction, and which serve to support the conclusions arrived at from the earlier experiments.

EXPERIMENTS.

Four earthenware basins, each two feet in depth and two and a-half feet across, were filled with fragments of felspar of different degrees of fineness, the coarsest fragments being placed lowest. In each of these basins sixty grains of barley were sown on the 5th of May (1857). The basins were then numbered 1, 2, 3, and 4, and in each was placed a portion of an artificial manure, containing the following substances, viz :—

The double silicate of potash and soda (soluble), precipitated carbonate of lime, hydrated sulphate of lime, freshly precipitated phosphates of lime and magnesia, and chloride of sodium. The bases and acids of this compound, were in such proportion as nearly to correspond with the general composition of the ash of the barley plant.

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In addition to the above-named substances (which, it will be observed, contains no nitrogen,) a solution of urea was applied thrice in each week to basins Nos. 1 and 2, and a solution of sulphate of ammonia to No. 3. No. 4 was intended as a check upon the experiments with the urea, and to it, therefore, no nitrogenous substance was applied. All the basins were covered with glass shades, the air supplied to the interior of each being freed from ammonia by treatment with dilute sulphuric acid.

The urea used in my experiments was prepared by the following process :—

28 parts of dried ferrocyanide of potassium and 14 parts of peroxide of manganese, thoroughly mixed, were heated to dull redness. The resultant mass, after cooling, was treated with cold water, and the solution thus obtained, mixed with 20·5 parts of crystallized sulphate of ammonia, sulphate of potash and cyanate of ammonia were formed ; and the latter, on the application of a gentle heat, was converted into urea. I did not separate the sulphate of potash, as its presence did not interfere with the results of the experiments.

The felspar in basins Nos. 1 and 2 was occasionally washed with distilled water, and the washings tested for ammonia. I did not, however, in a single instance, detect the presence of this substance, which proves that the urea was not converted into carbonate of ammonia.

The barley experimented on was the variety known as *chevalier* barley. The growing plants were abundantly supplied with carbonic acid gas and distilled water. The plants were thinned at an early stage of their growth, so that there remained but 15 plants to each square foot of surface.

The results of the experiments were as follow :—

No. 1.—Period of complete germination, within 5 days.

Period of ripening, within 107 days.

Mean height of plants, including the ears, 29 inches.

Average return from the seed, 9 stalks.

Average produce in seed, 28 grains to each stalk.

Size of grain, 14,786 to the pound.

Amount of nitrogen in 100 parts of the dried grain, 2·740.

No. 2.—Period of perfect germination, within 6 days.

Period of ripening, within 112 days.

Mean height of the plant, including the ears, 26 inches.

Average return from the seed, 10 stalks.

Average produce from seed, 27 grains from each stalk.

Size of grain, 14,672 to the pound.

Nitrogen in 100 parts of the dried grain, 2.385.

No. 3.—Period of complete germination, within 8 days.

Period of ripening, within 105 days.

Mean height of the plant, including the ears, 26 inches.

Average return from the seed, 12 stalks.

Average produce in seed, 25 grains from each stalk.

Size of grain, 15,607 to the pound.

Amount of nitrogen in 100 parts of the dried grain, 2.388.

No. 4.—Perfect germination took place within 8 days, and stalks, on the average, 8 inches in height, were produced, but in no instance were seeds developed.

The following conclusions are, I consider, deducible from the results of these experiments :—

1.—That the perfect development of barley (and by inference, of other plants) can take place under certain conditions in soil and air free of ammonia and its compounds.

2.—That urea, in solution, is capable of being taken unchanged into the organism of plants.

3.—That urea need not be converted into ammonia before its nitrogen becomes available to promote the process of vegetation.

4.—That the fertilizing effects of urea are not inferior to those of the ammoniacal salts.

5.—That there exists no necessity for allowing drainings from stables, or other fertilizing fluids containing urea, to ferment, but that, on the contrary, greater benefits must be derived from their application in a fresh or unfermented state.

This year I induced several farmers to try the comparative effects of fermented and unfermented urine on grass. The general result has proved the superiority of the latter. The most extensive and accurate experiments were conducted at my request at the Government Model Farm, Glasnevin, near Dublin, by Mr. Baldwin, Lecturer on Agriculture to the Board of Education. They have completely demonstrated the inutility of preserving drainings for the mere purpose of allowing them to ferment, or in the language of farmers, "to ripen."

It is not a little suggestive, that the Chinese, so remarkable for their admirable economy of the natural manures, apply the urine to the land in an unfermented state. And the most casual thinker will readily understand that it must be wiser to apply it in this state than after a large proportion of its nitrogen has, as a constituent of ammonia, escaped into the atmosphere. Besides, they avoid the unnecessary expense of constructing costly liquid-manure tanks.

Independently of the experiments which I have made on urea, our knowledge of the composition and properties of the constituents of urine should have led *a priori* to the conclusion that these are for the most part in that digestible form in which they can be taken up into the organisms of plants.

My own labors and those of others have led me to conclude that substances capable of being used as food for plants, must possess the following composition and properties :—

- 1.—They must be soluble in the solvents usually present in the soil.
- 2.—They must contain more or less of the elementary constituents of vegetable substances.
- 3.—They must be in a perfectly oxidized (*teleoxidic*) condition.

In this contribution to the theory of manures, I have advanced nothing antagonistic to the views so ably advocated by Liebig on the subject of vegetable nutrition ; on the contrary, I am altogether disposed to believe with him that organic substances cannot minister to the wants of vegetable life. I do not regard urea as an *organic* substance, any more than I do carbonic acid, cyanogen, or ammonia. These bodies, as well as urea, may be artificially prepared from inorganic materials ; they are, therefore, not organic bodies, but rather the results of *organic action* —the ultimate products of the decomposition of organic substances. Carbonic acid, nitric acid, ammonia and the cyanides have been proved to be capable of supplying nutrient materials to plants. There is no *theoretical* reason why urea should not be added to the list. It is soluble, contains the four principal elementary constituents of vegetable structures, and is a perfectly teleoxidic body. It therefore possesses the composition and properties which distinguish the “food of plants.”—*London Chemist, Nov. 1858.*

INQUIRIES INTO THE FORMATION OF GUM TRAGACANTH.

By HUGO VON MOHL.

(Translated from the *Botanische Zeitung*, Jahrg. XIV., p. 33, 1857. by Berthold Seemann, Ph. D., F. L. S., with corrections by the Author.)

An inquiry into the nature of gum tragacanth is not without theoretical interest, as it is connected with some difficult points of anatomy and physiology, which have not yet been sufficiently explained.

Tournefort (*Relation d'un Voyage du Levant*, Amsterd. 1718, I. 22,) was the first to whom we are indebted for closer observations on the exudation of gum tragacanth. His observations were made on Mount Ida, in Crete, and on *Astragalus creticus*, Lam.* Judging from a figure given by him (p. 21,) the stem of the plant in question attains about one inch in thickness. The secretion of tragacanth in the form of twisted filaments takes place in June and the succeeding months. Tournefort looks upon the gum as the nutritious sap which has become thickened by heat, has burst the vessels, discharged itself in the middle (*dans le cœur*) of the stem, and branches as well as in the medullary rays (*dans l'interstice des fibres, les quelles sont disposées en rayon*,) and is then gradually forced out on the surface of the stem, by the sap ascending by the roots, and hardens in the air in the form of worms. He further adds the supposition that the contraction of the fibres of the stem assists the forcing out of the gum, as the hemp-like divided fibres, exposed to the tread of shepherds and horses, draw together in the heat, and favor the excretion of the sap.†

* Sieber (*Reise nach Creta*, ii., p. 68) has, it is true, endeavored to show Tournefort's statement to be utterly undeserving of credit, as, according to his own (Sieber's) observations, the plant named does not yield any gum tragacanth whatever; but, as not only Tournefort's statement respecting the places in which the stem of the plant produces gum tragacanth, but also respecting the season of the year in which it is secreted, as well as the aiding of the secretion by wounding the stem, are confirmed a century later by Oliver in Persia, nobody will be misguided by Sieber's contradiction of Tournefort's statement, that the plant alluded to does secrete tragacanth in Crete. If Sieber invokes the testimony of Belon in support of his view, he does so improperly; for Belon (*Observat.*, p. 23) merely says the gum is collected

† We have thought it well to give the quotation from Tournefort in full.—
Ed. Ph. J.

“ * * * Elle donne naturellement de la gomme Adragant sur la fin de Juin,

With these statements agree in many instances those of Oliver (*Reise durch das türkische Reich.* (Germ. transl.), iii., page 293,) who observed the secretion of gum tragacanth from *Astragalus verus* in Persia. In this species also the stem attains an inch and more in thickness, and the gum appears during the time of the greatest summer heat, partly when the influx of sap bursts the bark, partly when the footsteps of animals injure the stem.

Additional confirmation respecting the season in which tragacanth is forced out of the stems, is contained in the statements of Labillardière and Landerer, the first of whom saw the gum in the Lebanon on *Astragalus gumifer*, Labill., during the month of August; the latter in Greece, on *Astragalus aristatus*, during August and September. The statement that wounding the plant favors the exudation of tragacanth, is likewise confirmed by the custom of making incisions in the plant, prevalent about Bitlis (Ritter's *Erdkunde*, x., p. 689.)

As another external condition favoring the secretion of tragacanth, Labillardière (Rozier, *Observations sur la Physique, &c.*, 1790, t. xxxvi., p. 48) names the humidity of the air, stating that in the Lebanon, cloudy nights and heavy dews are necessary for the emission of the gum, which only flows abundantly during the night and a short time after sunrise. On this account the shrubs growing in less elevated parts of the Lebanon, and subjected to great heat during the day, and a very limited nocturnal humidity, yield but little tragacanth.

These statements obtain a confirmation from the observation

et dans les mois suivants: dans ce temps là, le suc nourricier de cette plante, épaisse par la chaleur, fait crever la pluspart des vaisseaux où il est renfermé: non seulement il s'amasse dans le cœur des tiges et des branches, mais dans l'interstice des fibres, lesquelles sont disposées en rayon, comme il paroit, en la tige [fig.] A: ce suc se coagule en filets, de même que dans les porositez de l'écorce; et ces filets passant au travers de cette partie, sortent peu à peu, à mesure qu'ils sont poussés par le nouveau suc que les racines fournissent: cette matière exposée à l'air s'endurcit et forme ou des grummeaux ou des lames tortues, semblables à des vermisseeaux plus ou moins longs, suivant la matière qui se présente: il semble même que la contraction des fibres de cette plante contribue à la l'expression de la gomme Adragant: ces fibres déliées comme de la filasse, découvertes et foulées par les pieds des bergers et des chevaux, se raccourcissent par la chaleur, et facilitent la sortie du sac extravasé."—*Relation d'un Voyage du Levant*, Paris, 1717, tome i., pp. 55-6.

made in Greece by Fraas (*Synopsis Plant. Floreæ Classicæ*, p. 59), who states that no gum is produced in the mountains of the Peloponnesus by *Astragalus artistatus* and *A. creticus*, nor on Mount Parnassus, nor on the drier mountains generally, whilst there is gum collected in Achaia. He considers the exudation of the gum as dependent upon climate influences, and ascribes it to the quantity of cold rain alternating with great heat in the mountains of Oalaryta, &c.

Labillardière, from the facts observed by him, draws the conclusion that the tragacanth shrub, exposed during the day to the broiling heat of the sun, partakes quickly of the moisture of fogs, and that the gum tragacanth, swollen by the moisture of fogs and dews, forces a passage through the pores of the bark, and appears in the form of twisted worms or drops.

The observations of Labillardière induced De Candolle (*Astragologia*, 1802, p. 12,) to explain the manner in which gum tragacanth is forced out in a somewhat different way. He compared the exudation of tragacanth with that of the *Nemaspora erocea* (at that time held to be a mere gum, and not a plant), from the bark of beech-wood, preserved in a moist place. This view he still maintained in his *Physiology* (i., p. 175,) after he had acknowledged *Nemaspora* to be an independent plant, having been convinced that the appearance of *Nemaspora* on dead trees stood in connexion with the moisture of the atmosphere, and concluding from this fact that the influence of moisture caused the wood to expand more than the bark, in consequence of which the former was as if tightly sheathed, and therefore could press mucilaginous substances contained in the inner layers of the bark to the surface. This explanation did not meet with favor from Treviranus (*Physiol.* ii., p. 21,) who assumed that the appearance of the gum originated in an increased secretion of the same.

The above-named botanists entertained not the slightest doubt that gum tragacanth was a mucilaginous sap secreted by the plant; and the same applies to the pharmacologists, even the most recent, as for instance, Pereira. Kützing (*Philosoph. Botanik*, i., p. 203,) on the contrary, in consequence of microscopical investigations of the exuded gum, advanced the view that it was an independent organism, a fungus, consisting of cells filled

with starch, between which the fibres of the mother plant were placed. The walls of these cells, formed by several thick layers, consisted of bassorine, and were lined with a tender membrane of cellulose. Proofs of the fungoid nature are looked for in vain. They would not have been superfluous, even if only on account of the great curiosity which a fungus with cellulose membrane and starch granules would present.

An essentially different origin is assigned by Unger (*Anatom. und Physiolog. der Pflanzen*, 119) to gum tragacanth. He states it forms in several species of *Astragalus* the secondary layers of the medullary rays.

Other microscopical investigations of tragacanth, from which something might be learned, are unknown to me. Those of Guibourt (*Hist. Naturelle des Drogues Simples*, 4 édit., tom. iii., 420) are without interest.

In order to obtain an explanation of the nature of gum tragacanth, I considered it, above all, necessary to examine not only the different kinds of commercial gum, but also the stems of a greater number of *Astragali* of the section *Tragacanthæ*. Unfortunately my materials were so far incomplete, that there were no thick stems at my disposal, the largest being herbarium specimens, about the thickness of a little finger, on the bark of which no exudation of gum tragacanth was visible. The following will show, however, that these materials were, notwithstanding, sufficient to reveal the manner in which the gum is formed.

For the examination of exuded tragacanth, thin, flat pieces of the gum are best suited. A transverse section of such a flat piece, macerated in water, shows a considerable number of thick-walled cells lying in an amorphous mucilaginous mass. The walls of these cells are colorless and gelatinous, and consist of thick, partly well-marked layers, resembling in this respect the stratified substance of a starch granule. In the cavity of this cell small starch granules, more or less numerous, are deposited. A closer investigation of these cells requires the application of iodine. This acts but very slowly, whilst an iodized solution of chloride of zinc produces during the first few hours no other alteration than that of coloring the starch granules blue and the walls of the cells pale yellow. It is only after the action of the solution for twenty-four hours or more that the walls of the

cells begin to exhibit distinct colors. The inner thin layer of the cells is now found to be of a lively violet color, and likewise in the thick swollen cell-membrane itself by thin layers more or less intensely violet-colored, and separated from each other by thick, uncolored, gelatinous layers, are apparent. The outer of these colored layers are often rent, in which case the uncolored gelatinous substance has partly forced itself through the rents and become mixed with the mucilaginous substance in which the cells lie imbedded. On account of this partial solution of the outer cell-layers, the size of the cells, the diameter of which is about $0''.07$, cannot be accurately determined, and many of the torn-loose pieces of the cell layers colored violet by iodine are irregularly distributed in the amorphous mucilaginous mass.

In vermiform tragacanth the cells were far less perfectly preserved, and the amorphous mucilage in which membranes and starch granules of a paler or darker violet color were scattered, constituted a relatively larger portion of the entire mass.

Still less frequently occur well-preserved remains of cells in the yellowish nodular tragacanth of Syria, in which moreover the abundance of starch granules is far more considerable, and the granules themselves larger in size and frequently united into compound grains.

To be continued.

HISTORY OF PHARMACY IN RUSSIA.*

BY PROF. DR. C. CLAUS OF DORPAT.

The first and at that time only apothecary in Russia was an Englishman, James Frenkham, who together with physicians had been sent by Queen Elizabeth to Czar Ivan Wasiliewich IV. about the year 1584. Previous to that time, medicine and pharmacy were practised by priests and monks, and also by

* This was the subject of an address, delivered by Prof. Claus in 1853 in the "aula" of the University of Dorpat, and subsequently published in the "Inland," a periodical little known outside of Russia. The author revised and republished it in Wittstein's *Vierteljahrsschrift*. 1838, p. 502—527. The above paper is an abridgement of this latter paper by Mr. John M. Maisch of Philadelphia.—*Ed. Am. Jour. Ph.*

women, who attended chiefly to diseases of women and children. Czar Michael Feodorowich found the "Apothecaries Board," the first medical office in Russia, entrusted with the regulation of all medical affairs; he induced many foreign physicians to emigrate to Russia, and furnished the army with field apothecary's shops containing about 25 medicaments.

Alexei Michailowich opened a second apothecary's store in Moscow, and began to collect roots and herbs in the country instead of having them imported from England; he had three large botanical gardens planted in the neighborhood of Moscow, and ordered the woiwods to pay part of the taxes in medicinal plants from the interior. The third imperial store was opened in Wologda, and Feodor, the brother of Peter I., built the first hospital in Moscow, connecting therewith a surgical college for native physicians.

During the reign of Peter the Great, eight private drug stores were opened till 1712, and imperial stores in Riga, Reval, Kasan and other cities. Peter founded in Petersburg the land and sea hospitals, together with a college for army surgeons, in Lubna, the great field drug store from which all the smaller ones were furnished with medicines, and the large prescription store which is still in existence in St. Petersburg, from which poor civil and military officers receive their medicine gratis. During the reign of Anna, Elizabeth and Catharine II., the number of drug stores increased considerably in both capitals, but in less proportion in the provincial towns where the government was obliged to establish stores for the accommodation of the people, and of late it was found necessary to place impediments in the way of obtaining licenses for the cities so as to force pharmaceutists to the smaller country towns. Within 270 years the number of pharmaceutical stores was increased from 1 to near 700 (Poland excluded,) of which at last two-thirds were established in this century.

The furniture of the first crown stores was imported from England and made of costly polished woods, the bottles of cut crystal-glass with covers of massive silver; among the medicines were pearls and precious stones, bezoardicum solare, a powdered gold perfumed with amber, &c. The price of some Russian drugs at that and the present time compares as follows: Musk

per lb. 12 to 24 rubels, now 300 r.; Castor 1 r. 50 cop. to 2 r. 50 cop., now 200 to 250 r.; Rhubarb per pud 20 r.; now 120 r.

A special officer with several clerks has charged with the supervision of the stores, the regulation of the income and the expenses; the apothecaries had only to prepare and deliver the medicines, attend alternately to the business, and were subject to a strict discipline and control. Some of them were called alchymists; they were probably proprietors of formulas for popular nostrums. The salary of the apothecaries was considerable for that time—300 to 360 rubels; it was larger than that of the court surgeons, but less than the physicians', which reached 500 or 600 rubels; or in lieu of a part thereof board and liquors from the Court. The Court apothecaries had to be present at the examination of physicians soliciting an appointment, and to sign the diplomas of physicians who had graduated in Russia. The first work in the Russian language treating on medicine, pharmacy and natural history, entitled *Cure-book*, was a manuscript of 1560 folio pages with illustrations of plants, animals and minerals; it was translated from the Polish, in 1588 the original of which was a Latin work; several copies were preserved in Moscow up to 1812, since which time they have not been found.

With the foundation of St. Petersburg the emigration of physicians and apothecaries into Russia commenced, and new life was thus infused by the establishment of private drug stores, so that under the reign of Elizabeth Petrowna, we meet in John G. Model with the first pharmaceutical author, who was looked upon as the first chemical authority in Russia, and whose periodical "Chymische Nebenstunden," (Chemical Leisure Hours,) was translated into French. The Academy of Sciences of St. Petersburg opened in 1725, and the first Russian University, founded in 1755, had a most salutary influence on the progress of pharmacy, as had also the surgical institute of St. Petersburg, where the lectures were delivered in German; to those of pharmaceutical interest were invited the young pharmaceutists of the private establishments. Previously, by command of Catharina II., several medical works were translated into Russian, in which language also some original works appeared. The first Russian Dispensatory was published in 1765, the second edition

1778; the *Pharmacopœia rossica castrensis* appeared in 1779. Among the pharmaceutists of this time was Lowitz, who discovered the absorbing power of charcoal, and Kirchhoff who first transformed starch into sugar.

In the present century, the establishment of the Medico-Chirurgical Academies of St. Petersburg and Moskow proved of great advantage to the pharmaceutists, particularly since the connection therewith of a pharmaceutical department, where not only practical apprentices and assistants were admitted, but also pupils of higher schools, who could pass the examination, and who were thus instructed first theoretically before they could acquire the requisite practical knowledge. The University of Dorpat, where the first distinct pharmaceutical institute was founded, has the merit of having educated the ablest Russian pharmaceutists. The reason for this fact is, that from the beginning at this University the professorship of the pharmaceutical branches has been entrusted to practical men of this profession, which was never compelled to take a subordinaterank, as is too often the case in the hands of men otherwise too much engaged professionally. The following celebrated pharmaceutists occupied there the chair of chemistry : Grindel, Giese, T. F. Goebel, Arzt, Scherer, Osann, Siller and Charles Schmidt. Scherer was the editor of the Northern Journal for Chemistry, and the first president of the Pharmaceutical Society of St. Petersburg, which, by his intercession, received the imperial sanction in 1819. Not until more recently did men acquire in other parts of Russia decided reputation in chemistry.

After the opening of academies and universities, the examination of young pharmaceutists was taken from the hands of appointed physicians and entrusted to those institutions. Under Nicolai Pawlowich the regulations concerning pharmaceutists were completed. There are now three pharmaceutical degrees in Russia, *apothecaries' assistants* who are allowed to practise pharmacy under the supervision of persons of a higher degree; *provisors* who have to serve three years as assistants and to pass examinations, must have absolved an academic course ; they may become possessors of stores ; *magistri pharmaciæ* must be provisors for one year, and may compete for professorships and the higher pharmaceutical offices.

Of the 700 dispensing stores in Russia, there are 75 in St. Petersburg, 26 in Moscow, 4 in Dorpat, 14 in Riga (60,000 inhabitants) and one in each of the following cities: Astrachan (46,000 inhabitants,) Perm, Orenburg, Ufa, Catharineburg, Jobolsk, Tomsk and Irkutzk, all places of from 15 to 40,000 inhabitants. In Siberia, there is one dispensing store for each 20,000 square miles (about 400,000 sq. m. Engl.) The furniture and the interior arrangements of these stores are generally unexceptionable, and the fixtures of some stores in the principal cities have cost as high as 10,000 rubels (about \$7,000.) Model pharmaceutical establishments, however, are more frequently found in the interior, particularly in the provincial capitals. In all establishments may be found good sets of pharmaceutical and chemical apparatus, mostly with the latest improvements, and their business is purely pharmaceutical without the addition of the grocery, hardware, liquor or other business, as is sometimes met with in other countries.

The amount of trade of the Russian drug stores is of course very unequal. There may be 2 with an income of 40,000 rubels, 5 with about 25,000 r., about 50 with from 10 to 15,000 r., while the majority have a gross revenue of 3 to 5,000 r., and in the small interior towns between 1000 and 2500 r.; the smallest business amounting to but 300 r. annually, is done in Zaryzin, a town with 4426 inhabitants.

In regard to education, the mass of the Russian apothecaries compare favorably with those of other countries, the ignorant are by far in the minority. With the exception of the capitals, the pharmaceutists are so thinly scattered throughout that colossal empire, that they are in fact lost in the space, and a mutual intercourse between them cannot be kept up. Of late, pharmaceutists have been appointed professors at the Universities of St. Petersburg and Moscow, and thus had occasion to more widely distinguish themselves. Among the living Russian pharmaceutists native as well as naturalized, are some who have gained fame beyond the limits of Russia, and many men distinguished in other sciences have been reared in the school of pharmacy.

Formerly Scherer's Northern Journal of Chemistry was the organ of the Russian chemists and pharmaceutists; but there

are now few pharmaceutical authors in Russia, owing to the foreign literature, with which in a mercantile point of view a competition is impossible.

Apothecaries and their business free of any and all taxation.

ON IODIDE OF ETHYLE.

BY DR. DE. VRIJ.

For the preparation of large quantities of iodide of ethyle de Vrij recommends the following method. Absolute alcohol, which must be kept well cooled, is saturated with dry hydrochloric acid gas, and the amount of hydrochloric acid determined in a sample. This alcoholic solution of the gas is then placed in a retort with as much powdered iodide of potassium as is exactly necessary to form chloride of potassium; the mixture is allowed to stand a day, and then the iodide is distilled off, washed, and rectified. In the same manner iodide of methyle may be prepared. On adding wood-spirit saturated with hydrochloric acid to iodide of potassium, an action accompanied with considerable rise of temperature is established. Bromide of ethyle is easily prepared by distilling 4 parts of bromide of potassium with 5 parts of a mixture, consisting of 2 parts oil of vitriol and 1 part of alcohol of 96 per cent.—*London Chem. Gaz. Dec. 1, 1858, from Journal de Pharmacie.*

ON THE TESTING OF NITRIC ACID AND NITRATE OF SODA FOR IODINE

BY PROFESSOR STEIN.

The problem to be solved is evidently the setting free of the iodine present in the nitric acid in the form of iodic acid (or perhaps more correctly chloride of iodine); in other words to effect a process of reduction within the strongly oxidizing nitric acid. After several unsuccessful attempts the author employed tin as a reducing agent, and sulphuret of carbon for the detection of the iodine; and this succeeded so perfectly, that iodine could be detected not only in acid purposely mixed with iodine, but also in commercial nitric acid derived from various sources.

A quantity of the acid to be tested is poured into a test-tube

and a rod of tin is immersed in it until red fumes are distinctly evolved. The rod of tin is then taken out, and a small quantity of sulphuret of carbon is poured in ; the mixture is shaken and left quiet for a few moments. The stratum of carbon which usually collects over the acid appears of a red color, unless the amount of iodine in the acid be too small. With traces of iodine the color of this stratum may only be deep yellow. In this case however, it becomes red, when the sulphuret of carbon is drawn off and evaporated in a small porcelain capsule by blowing upon it.

To show the sensibility of the test, 1 decigramme of iodide of potassium (or 0.076 grm. of iodine) was dissolved in 121 grms. of nitric acid free from iodine ; this is nearly 1 : 1600. In this acid the iodine could be very distinctly recognized. This was also the case when it had been diluted to five times the quantity. When diluted to ten volumes, it was no longer possible to detect the iodine by sulphuret of carbon. If the limit of sensibility lies half way between the last two dilutions, it is 1-12,000th.

The tin, as may easily be understood, does not act specifically so that zinc, iron, or copper may be employed in place of it ; the action of tin is, however, the most certain. It was also clear that it is not the metal itself that acts in this experiment, but the lower grades of oxidation of nitrogen produced by its contact with the nitric acid. It was proved by direct experiments that it is nitric oxide, the action of which upon iodic acid was already known. This, however, is preferable to sulphuretted hydrogen and all other reducing agents, because it cannot act upon the nitric acid itself, but only quite directly upon the iodic acid. The clearest proof that it is due to the action of nitric oxide is furnished by the red fuming nitric acid of commerce, which needs only be diluted with water, to enable iodine to be detected by sulphuret of carbon.

Although one would hardly feel inclined to employ nitric oxide itself instead of tin, the author nevertheless states that the latter has a more certain action than the former. Thus, if iodine be present as chloride of iodine, which, if not always, may certainly sometimes be the case, this is decomposed by tin, but not by nitric oxide.

By means of the test just described, the iodine in nitrate of

soda may also be very easily detected. A certain quantity of this salt is put into a test tube, and water and nitric acid, free from iodine are poured over it; a rod of tin and sulphuret of carbon are then employed as above described. If sulphuric acid be employed instead of nitric acid to set free the iodine, the result is less distinct in consequence of the simultaneous evolution of chlorine and the formation of chloride of iodine. The sulphuret of carbon is always colored dark yellow, and the red color does not make its appearance until a portion of the sulphuret of carbon is volatilized and with it the chlorine.—*Ibid., from Polyt. Centralbl.*, 1858.

THE CONVERSION OF ACETIC ACID INTO METHYLIC ALCOHOL.

By C. FRIEDEL.

The experiments of Kolbe on the electrolysis of the salts of the fatty acids have shown that the radicals of the acids may be decomposed, giving origin to the radical of the alcohol which contains 2 equivs. of carbon less than the acid.

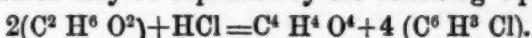
The formation of the acetones may be regarded as an analogous fact, only that, two molecules of acid being present, the radical of one is decomposed, and the radical $C^n H^{n-1}$, which is thus produced, forms a double radical with the undecomposed group. This is what has been assumed from the theoretical views of Gerhardt and Chancel, and the experiments of Williamson upon the formation of the mixed acetones. Hitherto, however, the existence of these alcoholic radicals in the acetones has not been proved.

The action of muriatic and hydriodic acids upon acetic acetone has furnished this demonstration, and at the same time an easy means of converting acetic acid into methylic alcohol.

At the ordinary temperature and pressure muriatic acid has scarcely any action on an acetone. Still this substance dissolves muriatic acid in considerable quantities ; and if the solution be enclosed in a thick matrass hermetically sealed, and heated in the water bath for eight or ten hours, the liquid separates into two strata. When the matrass is opened, an abundant evolution of gas takes place with an ebullition which carries off a portion of the liquid, unless the vessel be cooled with ice. The

gas evolved burns with a green flame, and by analysing it eudiometrically, it was found to furnish a volume of carbonic acid rather larger than its own. Chloride of methyle would furnish exactly its volume of carbonic acid. The excess of carbon found is due to a little acetone, from which the gas is freed with difficulty; it may be removed in part by means of water and distillation.

The remaining liquid also contains a little acetone and an acid possessing the odor of acetic acid, boiling between 212° and 248° F.; with oxide of silver this forms a salt which crystallizes in white needles and contains 64.31 of silver. The acetate contains 64.66. The acid is therefore acetic acid regenerated in a reaction which may be expressed by the following equation:—



To collect the ether produced more readily, the author substituted gaseous hydriodic acid for muriatic acid. Hydriodic acid acts upon acetone at the ordinary temperature, and as soon as the acetone is saturated with hydriodic vapors, it may be distilled, and furnishes much iodide of methyle and acetic acid.

The iodide of methyle passes in distillation almost entirely between 109° and 113° F., but nevertheless it still contains acetone and cannot easily be obtained pure. By treating it with oxalate of silver in a closed matrass heated in the water-bath, oxalate of methyle is obtained, boiling between 320° and 331° F., and crystallizing in fine laminæ. Its analysis gave—

	Found.	Calculated.
C	40.72	40.67
H	5.34	5.07

This oxalate, treated with potash, furnished wood-spirit, boiling between 149° and 156°F., which, when rectified first over quicklime and then over fused potash, gave the following numbers:—

	Found.	Calculated.
C	37.31	37.50
H	12.59	12.50

In this reaction, besides iodide of methyle, only acetic acid is produced. The portions of the acid boiling at the highest temperatures, furnished, with oxide of silver, only acetate of silver, containing 64.08 per cent. of silver. The action of iodide of

phosphorus upon aqueous acetone gives the same results as that of hydriodic acid ; but the most convenient method consists in heating acetone with a concentrated aqueous solution of hydriodic acid in a matrass.

As is shown by the formula above indicated, 4 molecules of ether are produced from 2 molecules of acetone. Taking as a starting point 4 molecules of acetic acid, we may regard the reaction in question as completing a decomposition of the acetylo radicals which they contain, which is commenced by their conversion into acetone.

It is probable that this reaction is general, and that it will allow us to pass from any acid to an inferior alcohol, and consequently from one alcohol to any inferior alcohol. It at the same time furnishes us with a reagent which will allow us to study even the radicals of the acids.—*Ibid from Comptes Rendus*, June 14, 1858.

Varieties.

PRACTICAL OBSERVATIONS ON THE INTRODUCTION OF PRESERVATIVE SOLUTIONS INTO RAILWAY TIMBER.

BY F. HEWSON, C. E.

The use of timber upon our railroads is considered indispensable ; it is everywhere found in the superstructure of our tracks, and forms the chief material of our bridges ; its renewal is the most expensive item of repairs. The life of a sill seldom extends longer than eight years, and the rate of annual depreciation being $12\frac{1}{2}$ per cent., can be applied to the estimate for the durability of the bridges, and those structures which are unprotected against the assaults of heat and moisture, the active and unfailing agents of decay.

There are cycles in the history of a railroad like that of nations ; each has its era of good feeling, and the blessings of cheap government, to be followed by discontent and grievous burthens. The close of the first octennial period in the existence of a railroad track, is marked by the entire renewal of its wooden superstructure, involving an additional expenditure for labor. About a year or two preceding this troublesome epoch, the managers and proprietors become alarmed at the rapid and disproportionate increase in their repair accounts ; the spirit of economy and reduction

is infused into every department, and laudable efforts are made to restore the cheap management of previous years; those efforts are in vain, for the skill and fidelity of their officers and workmen cannot check the onward progress of perishable material to its destiny.

Upon the 25,000 miles of railway lines in the United States, it is here estimated that 3125 miles of the timber superstructure of their track are annually renewed, requiring an outlay of 3,500,000 dollars to furnish the supply.

These prefatory data show the importance of seeking some effectual method of arresting this erroneous waste of capital. The chief obstacle to this end has been the great outlay required in the outset for the apparatus employed by the usual process, which is so inconvenient in character as to preclude their adoption in the construction of our railroads. These objections of expense and inconvenience are applicable to the systems of Kyan, Bethell, and Sir William Burnett, systems which have been adopted upon the leading works of Europe, by engineers distinguished alike for their genius and soundness of judgment.

Kyan's process is the simple immersion of the timber in corrosive sub-limate dissolved in water; it requires the employment of two tanks or reservoirs, into one of which the solution is pumped while the timber is being withdrawn.

It has been severely tested in the dock-yard of Woolwich, and has been employed with success in the Bavarian state railways. The writer has not been able to find any evidence against its efficacy.

The solution is an expensive one, besides being an active poison, which renders its adoption dangerous.

Bethell's process requires a strong cylindrical tank of iron, a steam engine, an air pump, a force pump, and a large wooden cistern or reservoir—when the timber is placed inside the cylinder, which is air-tight, a vacuum is obtained, and the solution, which is either coal oil or pyrolignite of iron, is forced under a heavy pressure into the timber.

It has been successfully employed upon the Great Western, the Bristol and Exeter, Manchester and Birmingham, North Eastern, South Eastern, Stockton and Darlington, London and Birmingham, and Cologne and Minden railways. It has received the endorsement of Robert Stephenson, Brunel, Bidder, Braithwaite, and other eminent names.

Sir William Burnett's process employs the chloride of zinc, with the same apparatus and mode of operation used by Bethell. It has been successfully tested on the Hanoverian and the Cologne and Minden lines, and has been used on the Oxford, Worcester and Wolverhampton, the Oxford and Birmingham, and the Vale of Neath railways.

Brunel has taken an active part in its introduction on the public works of England.

There has been a want of confidence relative to the treatment of timber by other systems. The processes of boiling timber or heating it to a high

degree of temperature, and then suddenly plunging it into the solutions, have been condemned by the highest authorities.

In the Ordnance Manual for the use of the officers of the United States Army, edited by Major Mordecai, assisted by Colonels Baker, Ripley, Hunger, and Major Symington, able officers, honored alike for attainments in science and services rendered under the flag of their country, it is stated that "kiln drying is serviceable only for boards and pieces of small dimensions, and is apt to cause cracks and to impair the strength of wood, unless performed very slowly, and that charring or painting is highly injurious to any but seasoned timber, as it effectually prevents the drying of the inner part of the wood, in which consequently fermentation and decay soon take place. Also in noticing Earle's process, which consists in saturating the wood in a hot solution of copperas and blue vitriol mixed together, has been tried by the ordnance department, but the results have not been favorable as far as regards its effects upon the strength and preservation of the timber." Boucherie also mentions his want of success in rarefying by a regulated heat, the air included in the interior of the wood, and then plunging it at once into the solutions, which he wished to introduce, though by this method, he caused different liquids to penetrate materials of a very compact nature; and he succeeded forcing tar into stones and bricks to a very great depth. The same authority states, "That it is infinitely more advantageous to act upon wood in its green state, than to prepare it after the time necessary for its complete dessication had sensibly altered it."

Tredgold, in his able and lucid manner, accounts for the effects upon the durability of timber produced by these processes which have thus been condemned—he says, "that it is well known to chemists that slow drying will render many bodies less easy to dissolve, while rapid drying, on the contrary, renders the same bodies more soluble; besides, all wood in drying loses a portion of its carbon, and the more in proportion as the temperature is higher; there is in wood that has been properly seasoned a toughness and elasticity which is not to be found in rapidly dried wood, and this is an evident proof that firm cohesion does not take place when the moisture is dissipated at a high heat."

The evidence of the Saxon and Bohemian railways given in the 29th number of the *Eisenbahnzeitung*, and translated to the valuable columns of the *United States Mining Journal*, practically confirms the unfavorable views of the authorities here quoted.

Additional adverse testimony could still be brought, but its introduction here would extend this communication to a wearisome prolixity.

The employment of the popular European methods of Bethell and Sir William Burnett upon American railways, which are too often started in haste, and without the means sufficient to properly complete them,—would be attended with two objections, in some instances so weighty as to prevent their adoption,—they are,

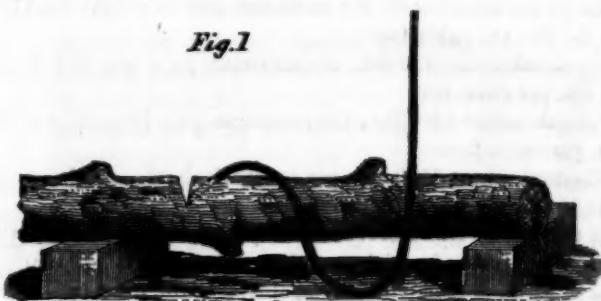
- 1st. The expense in the first cost of the apparatus required.
 2d. The difficulty in its proper location along the line of a route under construction.

What is wanted is some process which is simple, cheap, and efficacious. Boucherie's system of introducing the solutions longitudinally, through the pores or tubes of the timber, by the pressure of a column of any convenient height, is a step in the right direction to meet these necessities. A description of his first methods of operating has already been furnished in previous numbers of the *Journal*.

An account of the more recent improvements which have been adopted is given by Mr. John Reid, Jr., of Glasgow: an extract will not be deemed irrelevant.

"After the tree has been felled, a saw cut is made across the centre through about 9-10ths of the section of the tree, which is slightly raised at the centre by a lever or wedge so as to open the saw cut a little; a piece of string or chord is placed around the edge of the saw cut, and lowering the tree again, the cut closes on the string, which thus forms a watertight joint; an auger hole is then bored obliquely into the saw cut from the outside, into which is driven a hollow wooden plug; a flexible tube is fitted on the plug, the end of which is made slightly conical, so that the tube may be pushed tight upon it; the fluid flows from a cistern at an elevation of from 30 to 40 feet." (See fig. 1.)

Fig. 1



Mr. Reid further adds that the timber is most successfully operated upon within ten days after being felled, in which event, the process with a log 9 feet long, will occupy twenty-four hours. If the timber is felled 3 months, 3 days are required; if 4 months, 4 days.

To expedite the longitudinal transmission of solutions, an ingenious and simple apparatus has been contrived by John L. Pott, Esq., the intelligent proprietor of the Orchard Iron Works, in Pottsville; some idea of which can be formed by the following description.

It consists of a force pump, to the east iron frame of which is bolted a strong cylinder, also of cast iron, 9 feet long; the inside diameter being 12

inches. Into the further end of the cylinder, a hollow cast iron collar is accurately fitted, but can be withdrawn and replaced at pleasure, the joint being water-tight—from the sectional end of the collar which is foremost in the cylinder, there extends a rectangular punch sharpened and edged with steel, the area of which being less than the cross section of the railroad sills in use. This is driven by beetles into the end of the sill placed in the cylinder, and then firmly secured by strong bolts connected with the apparatus.

This plan of cylinder makes a water-tight joint, and at the same time allows the sap to escape, and secures a greater pressure at the end of the sill which lies against the pump. The power is applied by hand with a crank.

The writer experimenting with this apparatus, found that in certain classes of timber which were freshly cut, the sap would be driven out with great force, rapidly followed by the solutions. This was noticed especially with the rock, red, and black oak sills.

Under a heavy pressure varying from 1000 lbs. to 1500 lbs. per square inch, working for about two minutes, the sap for a few seconds would be ejected at the end of the sill; this would flow sometimes in jets like the discharges from a common garden watering pot, and at other times trickling in frothing exudations.

It was found that in white oak sills under the enormous pressure of 1320 lbs. to the square inch, the maximum gain in weight was $11\frac{1}{2}$ lbs. per sill, or 3.8 lbs. per cubic foot.

In black oak under 800 lbs., the maximum gain was $17\frac{1}{2}$ lbs. per sill, or 5.8 lbs. per cubic foot.

In red oak, under 1400 lbs., the maximum gain in a sill, was 29 lbs., or 9.6 lbs. per cubic foot.

In Chestnut, under 1500 lbs., per square inch, the maximum gain in a sill was 13 lbs., or 4.3 lbs. per cubic foot.

Upon cutting the sills most successfully operated upon, into thin cross sections of two inches in thickness, they were found to be so fully saturated, that by striking them violently against a board, the solutions would exude and cover the surface with moisture.

Though it required but two minutes in operating the pump for the complete impregnation of the sills, yet the time occupied in adjusting and removing the sill, and in filling and draining the cylinder, amounted to 18 minutes, and the saturation of 25 sills was the average work accomplished in 10 hours.

Boucherie's process is held in high esteem by his countrymen; it has been adopted on the Northern, the Eastern, and Nantes railways of France—and has been further sustained by a Board of Engineers of the Ponts et Chausées, and officers of Genise, in a favorable report to the Government.

It has certainly great merit, yet the importance of operating on the timber within a few days after it has been felled, and the manipulation re-

quired in its preparation, will cause inconvenience in the construction and repairs of American railroads.

After close analysis of the cost and details of the various systems, the writer has been induced to select capillary attraction as the agent for introducing the solutions by the correct way shown to us by nature in the vegetative process, viz: by expelling and following the sap longitudinally, through the pores and tubes of the timber.

Preceded by a number of satisfactory experiments, the following plan has been adopted:

The sills are placed vertically with butt ends down in a tightly caulked rectangular tank, 14 ft. long, 6½ ft. wide, and 8 ft. deep, built of 3-inch plank supported by upright stays, and further secured by transverse bolts, which prevent the sides from spreading. (See fig. 2.)

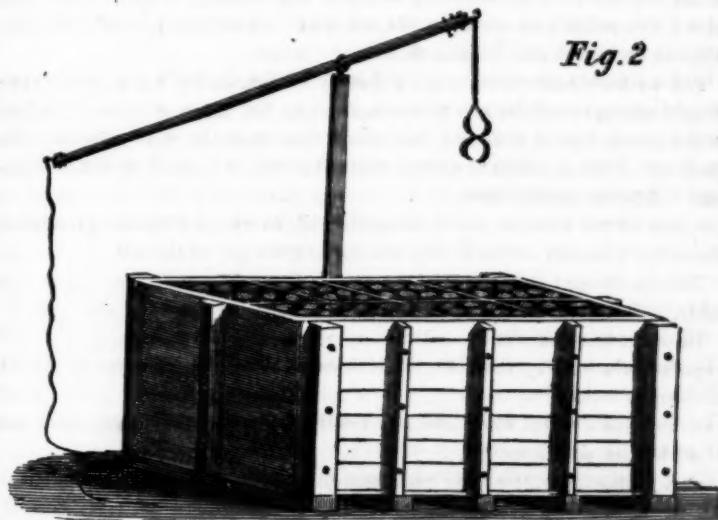


Fig. 2

When the tank is packed with sills, sufficient solution is added to fill it to the top of the sills.

In this simple apparatus, the pressure of a column seven feet in height is thus maintained at the butt end of the sill, the sap is expelled, and the preserving solution takes its place—a tank holding one hundred sills will cost about \$70, and weighing when empty, about 2 tons, it can be easily transported to any part of the road.

The number and kind of timber operated upon, together with the weight gained, and the estimated quantity of solution absorbed, are given in the following table: The sills remaining seven days in the tank—the solution consisting of one part of pyrolignite of iron, and six parts water.

Kind of Timber.	No. of sills operated upon.	Average pounds gained per sill.	Average pounds gained per cu. ft.	Average gallons per sill.	Average gallons per cubic ft.	Maximum gallons per cubic foot.
White oak,	1038	8.9	3.1	1.8	0.62	1.87
Rock oak,	96	11.5	3.9	2.38	0.78	1.87
Red oak,	153	10.0	3.9	2.04	0.78	1.70
Black oak,	903	9.6	3.6	1.87	0.72	2.64
Chestnut,	144	6.1	3.0	1.20	0.60	1.87
Hemlock,	617	7.5	2.6	1.51	0.52	1.87

After the lapse of seven days the increase of weight in the oaks appeared to be checked. The chestnut and hemlock being slower in absorption would require 14 days to complete their saturation. These facts ascertained by preliminary experiments, account for the discrepancy in the above table in the averages of these classes of timber.

The writer encountered some difficulty in estimating the exact quantity (liquid measure) of the solution absorbed, as the amount of sap displaced in the green timber is considerable, and consequently the estimate of the quantity of the solution absorbed from the weight gained would be incorrect. After a careful investigation it was found that the increase in the measure of the solution received by the sill, averaged 70 per cent. over and above the quantity called for by the gain in weight of the sill.

This increment is taken into the calculation of the gallon columns of the table.

In order to ascertain the relative extent or degree of absorption of the popular solutions by the different classes of timber, the writer caused to be divided into three equal parts, a rock oak, a white oak, and hemlock sill, each as thus divided was placed vertically in separate casks, which were filled by the solutions.

Cask with the chloride of zinc one pound to 10 gallons of water.

" blue vitriol one pound to 12½ gallons of water.

" pyrolignite of iron (density 1.101), 1 part of pyrolignite to 6 of water.

After the duration of one week

		gained in weight	6.8 per cent.
The white oak stick in the chloride of zinc,	" blue vitriol,	" "	7.9 "
" " pyrolignite of iron,	" "	" "	10.7 "
The rock stick in the chloride of zinc,	" blue vitriol,	" "	4.8 "
" " pyrolignite of iron,	" "	" "	4.6 "
The hemlock stick in chloride of zinc,	" blue vitriol,	" "	5.6 "
" " pyrolignite of iron,	" "	" "	9.7 "
			10.1 "
			7.6 "

The blue vitriol is absorbed more readily by the hemlock, and the oaks prefer the pyrolignite.

For the impregnation of the heavy timbers used upon bridges and other structures, a large wooden cistern 4½ feet in diameter in the clear, and 27

feet deep, was constructed of 3-inch seasoned white pine plank, tightly caulked in the seams, and bound with iron hoops; two courses of 3-inch plank were laid transversely and firmly secured at the bottom of the cistern.

This, when finished by the carpenters, we sunk into the ground until the top edge stood three feet above the surface. A hoisting crane is used in lifting the timber; the sticks being placed in a vertical position in the cistern, which should always be kept filled to its top edge with the solution—in this way, a pressure of a column 27 feet in height is maintained at the butt end of the timber.

The following table shows the quantity of solution introduced into a cubic foot of the different woods—the solution consisting of one part of pyrolignite of iron and six parts water :

Kind of timber.	Number of cubic feet.	Average absorption per cubic foot.	Maximum absorption per cubic foot.
White oak,	542	0·53 gallon.	2·72 gallons.
Rock oak,	833	0·71 "	2·04 "
Red oak,	39	0·93 "	1·87 "
Black oak,	67	0·85 "	1·45 "
White pine,	166	1·10 "	2·04 "

Timber freshly cut will receive the solutions more readily than when dry—some pieces of white oak which had been cut three months, absorbed per cubic foot 76 per cent. more than the same description and sizes of timber which had been twelve months felled.

It was also observed that in pushing some freshly cut beams with a sudden downward force into the cistern, the sap would appear on the top of the beam often in quantities to fill a wineglass.

These facts confirm the opinions of Boucherie, and show that the drying and seasoning of timber to prepare it for impregnation is an unnecessary waste of labor.

The expense of impregnating railway timber with the process advocated by the writer is but trifling.

The labor required is involved only in lifting and carrying the timber, and to this must be added the cost of the solutions absorbed. A statement of the cost of preserving sills with the usual antiseptics is here given.

Chloride of Zinc.

In proportions used by Brunel, viz : one pound to 10 gallons of water—cost of chloride of zinc 9 cents per pound.

Labor at tank, lifting and carrying the sills,	1·0 cent
Solution absorbed, 2 gallons,	1·8

Cost per sill,	2.8 cents.
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Blue Vitriol.

In the proportions adopted by Boucherie, viz : one pound to 12½ gallons of water, cost of blue vitriol 14 cents per pound.

Labor at tank, &c.,	1·0 cent.
Solution absorbed,	2·24

Cost per sill,	3·24
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Pyrolignite of Iron.

In the proportions adopted by the writer, viz: 1 part of pyrolignite to 6 parts of water—cost of pyrolignite 23 cents per gallon.

Labor at tank, &c.,	1·0 cent.
Solution absorbed,	6·5
Cost per sall,	7·5

The writer does not claim that this method of impregnating timber by capillary attraction is superior to any process extant, for such an assumption at this period would certainly be premature and somewhat arrogant. The question of its efficacy hangs upon a single point, which is this. Does it introduce a sufficient quantity of the preservative solutions to produce the desired effect? From the mass of data condensed in the tables given above, it appears that the average degree of absorption varies in the different classes of woods. The average of the sills impregnated in the tanks range from 0·52* to 0·78* of a gallon per cubic foot. The averages of the timbers in the cistern from 0·53* to 1·10* of a gallon per cubic foot.

In the interesting account of the Burnettizing establishment, at Gloucester, England, carried on under the direction of J. K. Brunel, Esq., C. E., published by J. B. Francis, Esq., it is stated in the course of describing the operation of the apparatus, that in a partial vacuum, a pressure of 120 lbs. to the square inch is maintained from two to four hours until $\frac{1}{6}$ of a gallon of the solution is forced into each cubic foot of timber, and this amount is deemed sufficient. With this favorable and reliable evidence, the writer is sustained in the opinion that capillary attraction can be advantageously employed as the agent of introducing preservative solutions into railway timber. Its chief merit rests on the simplicity of its requirements in the outset, and the economy of labor in its use.

Dr. Smith's Sepometer.—Among the many things which have troubled the minds of ordinary thinkers has been the assertion of chemists that the air had in all places the same composition. We cannot, therefore, be sufficiently thankful to Dr. R. A. Smith, of Manchester, for his discovery of an instrument by means of which we can ascertain the causes of the different degrees of purity of air. As, by means of this instrument, the actual amount of putrescible matter in the air can be measured, Dr. Smith has given to it the name of "Sepometer." The salt he uses as a measurer of impurity is almost the best oxidizing agent with which chemists are familiar; it is the permanganate of soda. The process consists simply in ascertaining how much of the permanganate is decomposed by a given amount of air. The indications are very beautiful, and exhibit the greatest difference between the air of towns, country, and sea. The use of blood by Dr. Smith is also novel. By means of the smallest quantity, we can almost instantly ascertain the difference between town and sea air, by shaking it with a small portion of blood in a tube. We shall be most anxious

*American Gallons.

to hear of experiments performed in the wards of our hospitals by the aid of the sepometer, and with the breath of patients, as we believe that much valuable information will thereby be obtained.—*Medical Times*.

Morison the Hygeist.—The following facts regarding this successful vendor of pills, we are told may be relied upon:—James Morison was a Scotchman, and a gentleman by birth and education. His family were of the landed gentry of Aberdeenshire, his brother being “Morison of Bogue,” an estate worth about £4000 a year, and some of finest granite-built mansions in Aberdeen—Morison’s Hall, for instance, belonged to him. In 1816, James Morison, having sold his commission, for he was an officer in the army, lived in No. 17 Silver street, Aberdeen, a house belonging to Mr. Reid, of Lowter & Reid, druggists. He obtained the use of their pill machine, with which he made in their back shop as many pills as filled two large casks. The ingredients of these pills, however he may have modified them afterwards, were chiefly oatmeal and bitter aloes. With these two great “meal bowies” filled with pills, he started for London, with the fag-end of his fortune, advertised them far and wide, and ultimately amassed £500,000. Mr. Reid was frequently importuned by Dr. Mohr, a fellow-student of the late James Macgreggor, under Dr. French of Marischal College to write to the *Times* and expose the whole matter, but he never complied.—*Athenaeum*.

Freestone of Extraordinary Strength.—On the 21st July, at the Smithsonian Institution, at Washington, Professor Henry tested the strength of the Albert freestone, which comes from Mary’s Point, New Brunswick. After adjusting the machine, a cube of the russet variety of this stone was first subjected to the crushing force, and found to withstand 9,250 pounds to the inch before giving way. Two cubes of the drab or olive variety were then tested, each of which sustained the like pressure of 9,250 pounds to the square inch. Professor Henry stated that this was the strongest freestone in the world.

Ambergris.—We learn from the *Boston Ledger* that a sale of 750 lbs. of ambergris was made in that city on the 8th inst., for the sum of \$10,000, and upon which the purchaser will probably realize \$6,000. It was taken from one whale, and brought home in a ship recently arrived at Nantucket. This substance is a morbid secretion of the liver of the spermaceti whale, and is generally used, in its alcoholic solution, as a perfume. It is more often found in whales of a sick and lean appearance, indicating that the ambergris is a product of disease. It is usually found in lumps of from one to thirty pounds in weight, and the largest piece hitherto known weighed 182 pounds, and was bought by the Dutch East India Company of the King of Tidore. Another piece from inside of a whale near the Windward Islands was sold for £500 sterling.—*New Bedford Mercury*.

Medicine in India.—Nothing, Judge Raikes tells us, astonished the earliest European traveller in India so much as the solicitude of the Gentoos for insect life, and their profound indifference to human suffering. Men died by the roadside uncared for; but for bugs and fleas regular hospitals were provided.

The character of the physician in the East is highly esteemed. Every school-boy knows that it was to an expert English doctor we owed our first step towards independence in Bengal; and every Englishman is looked upon as a "*hukeem*," and invited to prescribe for all kinds of ailments in all sorts of impossible conjunctures.—*Druggist's Circular*.

Carbonate of Ammonia in the Bites of Poisonous Reptiles.—Dr. A. S. Payne, of Paris, Fauquier Co., Va., from long experience in the treatment of poisoning by snake bites, spider-bites, &c., has come to the following conclusions:

"1st. That hartshorn is the natural remedy or antidote for the cure of all bites of poisonous reptiles or stings of insects which exert a rapid and depressing influence upon the heart's action.

"2d. That, in my opinion, second to the hartshorn, in remedial virtues, stands an etherealized solution of iodine.

"3d. That the biniodide of mercury has proven itself next most valuable.

"In the fourth place of value I place various plants indigenous to the United States of America."—*Virginia Med. Jour.*

Hairs of Urticaceæ.—The stinging hairs (*stimuli*) of Urticaceæ consist of a single cell, more or less elongated, swollen at its base, where it is sheathed by a layer of epidermal cells, and terminated sometimes by a sharp point, but more commonly by a small rounded pyriform or accumulated knob. The hair becomes broken in the skin, and allows the acrid fluid it contains to flow out. This gives rise to accidents of a more or less severe nature. The severity of the sting depends not on the quantity of fluid which enters the puncture, but rather on its activity. The sheathing portion of the hairs varies much in length. Sometimes it exceeds the free portion, as in *Urtica ferox*, one of the species, which gives a most dangerous sting. In some species of *Urera* and in one or two other genera, the sheathing portion increases much with age, becomes woody, and forms a true prickle or aculeus, analogous to the Rose and of some species of *Hibiscus*.

Glandular hairs, properly so called, are rare among the Urticaceæ. Species of *Fleury* present examples of these hairs, as well as the ribs of the lower surface of *Purietaria communis*, on which we also notice, as in *Forskohlea* and some other genera, hooked or uncinate hairs. The species of *Forskohlea* or of *Droguetia* exhibit in different parts of their inflorescence a mass of woolly hairs analogous to those which cover the cotton plant. None of the Urticaceæ have webbed hairs.—*Ed. N. Phil. Jour.*

Silk Worms.—One of the most active and distinguished of the members of the society of acclimation, M. Guérin Meneville, who has been especially interested in the introduction of new silk worms, has just succeeded in acclimating in France a new silk worm from China, where it lives in the varnish tree (*Aylanthus glandulosa*). This species is the true *Bombyx Cynthia* of Drury, (1773,) figured for the first time by Daubenton, Jr., in his colored plates which were published between 1760 and 1765, and raised for some centuries in China, where its silk clothes the people. Roxburgh, in 1804, supposed the *Eria* which is raised in British India, to be the same, and this confusion has continued till recently, so that the *Eria*, (or Arindy-arria, as it is called in Hindoostan,) has gone by the name of *Bombyx Cynthia*. The *Eria* is a different species living on the *Ricinus*; and we have several times spoken of it.

The study of the species by Guérin Ménéville, has brought to light differences between the two in the cocoons and the habits of the worms. The cocoons carded give an excellent flock of silk which is used in China and Bengal for very firm tissues. The color of the silk is a fine flax gray; and cloths made of it are not injured by the rain, or oil, and wear long.

Now that the introduction of the silk-worm is accomplished, attention is turned to the extension of it industrially. Guérin Minéville proposes for this end the making of plantations of *Aylanthus*, a tree that grows easily upon poor soil; and to place the worms upon them in spring that were hatched in the month of May, and let them eat the leaves. Care should be taken to preserve them from the birds, which is easily done by an invalid workman incapable of other work, as has been the custom for centuries in China. At the end of June the first crop may be gathered, and a second in August. The cocoons for reproduction should be preserved until the next May, which requires, as with the silk-worm of *Ricinus*, and the *Dipsacus cullonum*, special care in the winter.—*American Jour. Sci. and Arts* Nov. 1858.

On the Rate and Growth of Coral.—Mr. Theodore Lyman, referring to a large fragment of Madrepore Coral, taken from the wreck of a British man-of-war, and which he had exhibited at a recent meeting, said that he had since ascertained that the vessel was lost about the year 1806, or half a century since. The incrustation around the iron bolt, shows that the diameter of the coral must have been about three inches, and such a shaft, he supposes, would have supported a very high stem, so that the rate of growth might have been perhaps half an inch a year.—*Proc. Bost. Soc. Nat. Inst. in Silliman's Journ.* Nov. 1858.

Pepsin Wine.—We find in “L’Union Medicale” that the following pepsin wine is extremely agreeable and efficacious:—Take of starchy pepsin, prepared according to Messrs. Covisart and Bourdault’s formula, one

drachm and a half; distilled water, six drachms; white wine (of Lunch,) fifteen drachms; white sugar one ounce; spirit of wine (33°) three drachms. Mix until the sugar is quite dissolved, and filter. One tablespoonful of this wine contains about fifteen grains of pepsin, and may be given after every meal.—*Atlanta Med. and Surg. Journ.*

Editorial Department.

DR. EDWARD R. SQUIBB.—More than a year since we took occasion to remark that our friend Dr. Squibb of the U. S. Naval Laboratory, had, in connection with two other gentlemen, commenced the Louisville Chemical works. Having disconnected himself with that establishment at the end of the year, in accordance with a reserved right, Dr. Squibb made arrangements for opening a Laboratory for the supply of pure pharmaceutical chemicals, at 149 Furman St., Brooklyn, (New York,) and in advance had received the patronage of the medical department of the U. S. Army, for the supply of chemicals, etc., of a quality equal to those prepared at the Naval Laboratory. This establishment was just getting under way when a slight accident, big with disaster, swept it from existence, and prostrated its proprietor, a sufferer. Knowing the strong personal interest that is felt for Dr. Squibb by his numerous friends, in and out of the Association, we feel justified in quoting a few lines from a letter just received from him, which will explain better than our own words the nature of the occurrence.

Brooklyn, Feb. 15th, 1859.

MY DEAR SIR,—By the help of an amanuensis I am able to acknowledge your kind favor of yesterday, and can proceed to give you some detail of the disaster that has occurred to me. On the afternoon of the 29th of December, a new boy, whom I was teaching to put up preparations, accidentally broke a small bottle of ether. He was using a light to wax the stoppers, and had been so emphatically cautioned of the danger of a light near ether, that when the bottle broke he was so frightened that, as he says, "he lost his head and forgot to blow out the light." Soon, of course, the vapor caught fire, and as the ether had run among the other bottles they broke and added their contents to the burning fluid. As soon as it caught fire, he cried lustily to an upper story for me;—on arriving I found the whole table and a portion of the floor in a voluminous light blaze, and, passing behind, commenced to draw water from a faucet and throw it upon the flame. At one time I had nearly succeeded in extinguishing it, but unluckily a few larger bottles of ether, put up for hospital use, standing near, were broken and enflamed. Had my panic stricken people given me but a little assistance, instead of deserting the building, I should, even then, have succeeded in saving the property. As it was, however, the flame rapidly gained on me, and it was only when I saw the hopelessness of my efforts that it occurred to me that I was behind the fire (now extended across the building) without any

way of exit. Finding I must pass through the flame I took the longest possible run, closed my mouth and eyes and jumped through it, supposing I should not be burned. In the excitement of trying to save books, etc., I was not at first aware that I was burned, but the bystanders, and a numbness of my hands and face soon after made me aware of the fact, and I got home to my room, where I have been confined to the present time with a good deal of suffering. The face was rather superficially burned, and is now so nearly well that I trust in a week to be able to leave the house, with possibly only the deformity (besides scars) of eversion of one eyelid;—the hands, however, do not get off so well, nor get on so rapidly—the backs of both hands were deeply and badly burned, though it is still hoped the tendons escaped, so that you will see that for a bad burn, and perhaps a narrow escape with life, I am likely to get off with surprisingly little deformity."

After alluding to the abundant sympathy and kindness of his friends he remarks, "My landlord rebuilt the house at once for my use, and the mechanics who had just finished my apparatus and fixtures have them already replaced. I had an insurance, which though it does not cover my losses by some seven or eight hundred dollars, was promptly paid, and helps much in the reorganization. Everything goes on more rapidly of course than in the original outfit, since the mechanics know what is to be done, and get on easily by means of my chamber consultations; my eyes, which though uninjured were closed for five weeks, are now open and enable me to make drafts, etc., and I hope confidently from all these fortunate circumstances, that by the second week in March I shall be again under way with renewed energy and determination of purpose."

Our readers will now be aware that Dr. Squibb, though thus disastrously checked in the very inception of his enterprise, is not discouraged in his determination to proceed with the manufacture of pure Pharmaceutical chemicals. We heartily wish him success as a just reward for the liberal open manner in which, during the past few years, he has contributed his experience for the benefit of our profession.

QUINBY vs. ECKSTEIN—ALLEGED POISONING BY BELLADONNA—VERDICT.—There are circumstances connected with this case particularly interesting to pharmacists, and we would be glad to have given our readers an abstract of the evidence and the charge of Judge Spencer to the Jury, but our limited space wholly forbids it. The following is an outline taken from the Judge's charge as published. The plaintiff, George W. Quinby, (a preacher,) alleges that he placed in the hands of the clerk of the defendant, F. Eckstein, Jr., who is a druggist of good repute in the city of Cincinnati, a prescription written by Dr. Mighels, for extract of dandelion, instead of which the plaintiff alleges he received belladonna, which was taken, and caused him personal suffering and loss of the use of his limbs and reason for a considerable space of time, was months deprived of the power of transacting business, and put to expense in medical attendance, for all of which he claims damages in the sum of \$10,000. The defendant admits that his profession is that of a druggist, and that as such he puts up prescriptions, but in all other respects denies the averments of the petition.

The Judge then lays down the rule of action applicable to the case as follows:

"It should be premised here, that the foundation of the action is the negligence of the defendant. The business of a druggist was one that required him to exercise extraordinary care and prudence, so far, at least, as the public are concerned; and the reason for this is that in proportion as accidents may be fatal, or the community may be injured, more or less, by neglect or omissions, persons should be careful in avoiding these accidents. But all this is founded on the idea of negligence, for the law does not require that an apothecary shall insure that at all hazards a prescription is accurately put up.

It was claimed, on the part of the plaintiff, that irrespective entirely of any care exercised by defendant, he was bound to put up the article required, and that if he failed to do so, the other party would be entitled to recover for any damage arising to himself from such a failure; and the case was put by counsel that, if a merchant was requested to put up a certain article of commerce, and put up anything else, he was bound to respond in damages. This may be true, but it does not follow he is responsible for all the consequences. No man would be safe if he was required at all hazards to guard against accidents. If a merchant dealing in flour should sell an article not manufactured by himself, that looked fair, yet happened to be mixed with poison, he would not be responsible for any accident growing out of the sale, where the transaction was one in which he was not at all negligent. The commodity not being as it was represented in the first instance, he would be bound to restore the price paid for it, but where he had exercised prudence and care in the selection of the article, he would not be responsible for accidental consequences.

The same rule applies to a physician or apothecary; he is responsible only on the ground of negligence. It might be illustrated in this way: If this medicine had been in the first instance properly put up, and the plaintiff did not immediately take it with him, but left the store for a short time, (as was the case,) and then returned and took it away—some other article might have been substituted in the meantime, by the intervention of an agent over whom the defendant had no control—or that the defendant not being the manufacturer of the article, obtained it as genuine, when in fact it turned out not to be so, but different from that which he supposed it was—in either of these cases he would not be responsible further than for the price paid for the medicine."

The Court then reviewed the evidence and its bearing on these principles.

"The first inquiry which presented itself was whether the article that was put up was that which the prescription called for. If it was, there was an end of the action. Here the burden of the proof rests on the plaintiff. He claims it was belladonna. Were the Jury satisfied it was? Had the plaintiff sufficiently accounted for the possession of the gallipot throughout the whole time? As to the identity of the box itself, the defendant claims there is a link in the chain wanting—that a change in the article may have taken place, and that a boy being sent into town with the medicine, furnishes a theory by which that change may have been effected. In questions of this kind it was not required of the Jury to be satisfied beyond all doubt, but to exercise their judgment as men of common sense, and say where does the weight of evidence lead to.

The next question was, whether the contents are belladonna. The plaintiff alleged that it was analyzed in the city of Boston. This was an appropriate means of determining its nature; but so far as they undertook to rely upon it, the Jury should look into the evidence, and say whether the party had competent skill to perform the service, and applied the proper means to arrive at the results. If this is not satisfactory, they should then examine the other evidence referring to the ordinary means of ascertaining the nature and character of the article.

It was incumbent on the part of the plaintiff, not only to show that he received a different article from that complained of, but that it was belladonna, and that he received an injury from it, and traces the ills of which he complains, directly to its influence. The testimony of experts must be availed of.

An isolated experiment amounts to but little. It is by a series of experiments that men become familiar with the effects of poison, and skilful in their use."

The defendant claimed that the sickness of Mr. Quinby was from another cause, like apoplexy, or some affection of the nervous system, where the symptoms simulated those of belladonna.

The defendant also presented the theory that the plaintiff was hypochondriac, and that much of the symptoms were imaginary. The Judge then remarks :

"If they were satisfied that the article put up has been identified, that it was belladonna, that it was poisonous and produced the effect ascribed to it, then the plaintiff would be entitled to such compensation as he had pecuniarily suffered, if there was negligence on the part of defendant, unless the plaintiff himself was guilty of some neglect on his part.

In regard to negligence on the part of defendant in a case of this kind where a prescription calls for dandelion, and belladonna is put up, this makes out *prima facie* a case of negligence. The druggist is bound to put up the article called for, and if by mistake he puts up another, he is responsible for it *prima facie*; and it is no excuse that he used all the diligence he could, unless he can lay the fault to some other person, over whom he had no control. If he relies on the act of a third party he is bound to present the proof; as in the absence of testimony going to exonerate him, the law presumes he is negligent.

As to any negligence on the part of the plaintiff himself in the taking of the article, before he could be charged with it, a knowledge by him of the operation of the drug should be shown; and it would be further considered whether he did not show ordinary prudence in the means he did take to avoid accident. If he was advised of the nature of the article, and was careless in taking it, then he could not obtain a verdict; but if his suspicions were not aroused, and he took such means as men ordinarily take to avoid accident, there was then no fault on his part."

The Court then explained on what principles the damages must be laid, in case, under all the circumstances they found the defendant guilty of negligence. The Jury then retired, and returned in an hour with a verdict for plaintiff—damages \$2,500.

The extraordinary features of this case, which have justly excited surprise, are, the long lapse of time between the alleged error and the act of prosecution; the loose character of the plaintiff's evidence, as regards the identity and nature of the medicine obtained; and the improbability of the result, if extract of belladonna in the dose 2-3ds of a tea-spoonful had been taken, which from Eckstein's would have been of the best quality; besides, it appears in evidence that before taking the medicine, it was sent by a boy to the physician, who pronounced it all right. We have understood that the defendant applied for a new trial, but have not heard the result.

THE NEW ACT OF PARLIAMENT REGULATING MEDICINE—THE NEW BRITISH PHARMACOPEIA.—Many of our readers are perhaps not aware that in the year just passed, Parliament, after having considered the subject of medical reform during a long period, did pass an Act, tending to reconcile the conflicting elements of British medicine, by establishing a "*General Council of Medical Education and Registration*," which is made up of Delegates

from the Colleges of Physicians, of Surgeons, and of Apothecaries, (not Pharmacutists,) and from the Universities, together with six members named by the Queen, with advice of the Privy Council. The first meeting of this body was held at the Hall of the Royal College of Physicians of London, Nov. 23, and elected Sir Benjamin Brodie, President. At this meeting Dr. Christison, Sir James Clark and Dr. Apjohn were appointed to recommend a committee for preparing the National Pharmacopœia. At the adjourned meeting held Nov. 24, they made the following Report, viz :

"The Committee beg to suggest,—1st. That the following gentlemen be appointed a Committee to prepare and publish the National Pharmacopœia, with all convenient speed :—Dr. Christison, Dr. Thomas Watson, Sir James Clark, Bart., Mr. Green, Dr. Apjohn, Mr. Syme, Dr. Williams, Dr. Andrew Wood, Mr. Nussey and Dr. Leet, with power to add to their number, Dr. Christison to be convener. 2d. That this Committee shall have full power to communicate with the three Colleges of Physicians, and to request their co-operation in preparing the Pharmacopœia, and to beg them for that purpose to appoint fellows of the several Colleges, to be associated with the Committee of the General Medical Council. 3d. That the Committee shall have power to communicate with the Pharmaceutical Society for the same purpose. 4th. That the Committee shall have power to appoint a chemist or chemists, to carry on such chemical and pharmaceutical researches as may be found necessary, and to pay these gentlemen such remuneration as the Committee of the General Council may think advisable. 5th. That a sum of £500 be voted by the General Council from the registration fees of existing practitioners, in order to defray the cost of preparing the Pharmacopœia for printing."

The Report was adopted. It was moved by Mr. Lawrence, seconded by Mr. Teale, and resolved—That it be an instruction to the Pharmacopœia Committee, that the Pharmacopœia be published in the English language, with the list of the Materia Medica and compounds in the Latin language."

It is with pleasure that we record this great advance in English Medical reform. If the Act does nothing else but effect a fusion of the Pharmacopœias into one homogeneous formulary, it will deserve to be valued. We wish the committee entire success in their great undertaking, and are glad to find that they have not rejected the very valuable aid of the gentlemen of the Pharmaceutical Society.

REVISION OF THE PHARMACOPŒIA IN 1860.—At the annual meeting of the Philadelphia College of Pharmacy, to be held March 28th, it will be necessary to appoint a committee to revise the U. S. Pharmacopœia, as has been done in the two last revisions of that work in 1839 and 1849. As the composition of the committee should be carefully considered, to insure a valuable report, it is desirable that members should reflect on the subject before the meeting convenes.

CORRECTION.—The Editors of the "Journal of Materia Medica," &c., have attributed an article on Ammonio Ferric Alum to our pen, which is due to that of W. Hodgson, Jr., of Philadelphia. The error has arisen from the article in question having been inserted in the editorial department.

A Treatise on Diseases of the Air Passages:—Comprising an inquiry into the history, pathology, causes, and treatment of those affections of the throat called Bronchitis, Chronic Laryngitis, Clergyman's sore throat, etc. By HORACE GREEN, M. D., LL. D., President of the Faculty and Emeritus Professor of the Theory and Practice of Medicine in the New York Medical College, &c. &c. Fourth, edition revised and enlarged, with an Appendix. New York, Wiley & Halstead, 1858, pp. 348, octavo.

As the discussion of the subject of Dr. Green's work lies entirely without the province of this journal, we have passed it by with the simple announcement of its title page.

Trials of a Public Benefactor, as illustrated in the discovery of Etherization.

By NATHAN P. RICE, M. D., New York. Published by Pudney & Russell, 1859, pp. 460, 12mo.

This volume arrived too late to give a notice of it in this number. It is written in view of the claims of Dr. Morton, of Boston, as the discoverer of Etherization.

MEDICAL JOURNALS—OUR EXCHANGE LIST.—We have for some time past felt it due to the editors of several new medical journals to give expression to a few words on the subject of exchanges. There are but two pharmaceutical journals besides our own published within the limits of the United States, whilst the medical journals can be counted by scores. Of the selected matter contained in our pages, nineteen-twentieths or more come from kindred journals and these generally from beyond the sea. With but two of these we exchange, and hence the great part of our selected matter is made up from journals paid for in advance. We have on our list nearly all the American medical journals, of several years standing, and though seldom benefitted by their matter, owing either to its being inappropriate, or having been anticipated, we feel no inclination to discontinue their intercourse, and are always glad to find that our pages can occasionally be made useful to them, and they are entirely welcome to employ them; yet our extra copies are so few, that in some instances they have been nearly exhausted by the demand incident to postal irregularities. We hope, therefore, that those new journals who do not find us to respond to their invitation to exchange, will not consider us discourteous, but attribute our course to the necessity of self preservation.

OBITUARY—SOUBEIRAN.—It becomes our duty as chronicler of events interesting to pharmaceutists to announce that M. Soubeiran, the greatest of French pharmaciens, died on the 17th of Nov., of a tedious and painful disease. From an address by H. Buignet to the Society of Pharmacie, we learn that he was born at Paris, the 4th Prairial, year 5th (May, 1796,) and early manifested a marked taste for the study of the sciences.

In 1813 he entered the pharmacy of M. Pouzin, of Montpellier. After three years service he returned to Paris and completed his tuition under M. Montillard, Rue St. Honoré. At Montpellier, as at Paris, he had profited by his moments of leisure to earnestly pursue his theoretical studies. After his graduation in the sciences, he met with two instances of brilliant success. He was admitted as an *interne* of the hospitals, in his first year, and gained all the prizes in the natural and physical sciences, offered by the Concours of the Ecole de Pharmacie. He early became a contributor to the *Journal de Pharmacie*. In 1826 he commenced a special course on Pharmacie, which he continued to improve, and in 1832, on the death of M. Henry by cholera, his rare qualities caused him to be chosen as his successor. He made his new position useful to science by the increased perfection of his teaching and in the publication of the first edition of his *Traité de Pharmacie*, arranged in the order of the Natural System. In 1854 he was appointed to the Professorship of Physics at the Ecole de Pharmacie, which he occupied more than twenty years, and was noted for the excellence of his illustrations and apparatus. But it was in the Society of Pharmacie that M. Soubeiran exhibited those rare qualities which distinguished him as a Professor. Elected General Secretary of this Society on the demise of M. Robiquet, he identified himself so clearly with its interests that he became the soul of its labors, and directed all the discussions with indefatigable zeal and with an authority due to his great learning. His language was always brief and lucid, going directly to the point of the subject, and explaining in precise and appropriate terms the most difficult and delicate questions. On his election to the new Professorship of Pharmacology in the faculty of medicine, he resigned his functions as General Secretary, feeling that age was approaching and energy failing, as though he had a foreknowledge of the terrible malady that caused his death. He continued to manifest an interest in the Society up to the time when his last illness removed him from his labors.

Soubeiran has done much for Pharmacy in his excellent *Traité*, which passed through four editions, and which is certainly the most reliable and philosophical treatise among the numerous French works on his favorite subject.